VERSITY OF NEBR.
LIBRARY

FEB 11 1957

Contractors and Engineers

magazine of modern construction

FEBRUARY 1957

Rock production for turnpike. *Page 94.*

No matter WHAT YOUR JOB...

FINE GRADING—Contractor L. C. Smith finish grades 12,000 running feet of slope.

EXCAVATING—A Denver contractor finds Gradall best for digging in rock.

CONCRETE RIPPING—Gradall rips reinforcing rod from old New Jersey road.

TRENCHING—A Cleveland utility digs clean trench for conduit installation.

WHO YOU ARE...

BIG CONTRACT—Gradalls handle footer excavation on Ohio AEC Project.

SMALL CONTRACT—Gradall's offset boom easily handles trenching behind curb.

HIGHWAY DEPT.—Gradall economically cleans a mile of drainage ditch daily.

CITY STREET DEPT.—One of New Orleans' Gradalls rips and loads concrete slabs.

WHERE YOU WORK...

NORTH—Gradall's hydraulic controls accurately position concrete pipe.

SOUTH—Gradall digs ditch along side of new South Carolina highway.

EAST—By tilting Gradall's boom, operator digs out under gas pipe line.

WEST—California Gradall digs 800 yards of fine grade excavation daily.

Gradall® DIVISION OF WARNER & SWASEY **CUTS COSTS ALL YEAR LONG!**

® Reg. U. S. Pat. Off.

YOU CAN DO IT BETTER, FASTER, FOR LESS WITH A GRADALL

For more facts, use Reader-Reply Card opposite page 18 and circle No. 201

Contractors and Engineers

magazine of modern construction

CONTENTS

FEBRUARY 1957

AIRPORT
126 Concrete, hot-mix paving meets tight schedule

BRIDGES
26 Floating, land rigs team to construct causeway
56 Pours for tapered piers made in steel-stiffened forms
106 Special plant prestresses causeway trestle members

BUILDINGS
6 Shoring, forming innovations used in 4-story basement
116 Special rigging developed to place atomic vessel

DAMS AND FLOOD CONTROL
60 Small work area minimizes caving on storm sewer job
64 Big cableway system to serve concrete section of dam

GENERAL
5 Plywood panels prove economical on sewer shoring job
15 Beavers present eleven with gold awards
66 Dredges build disposal area for harbor waste
100 Draglines dig clay from cuts for railroad relocation
138 Russia bids for international market in road machinery
152 Concrete tetrapods: new shapes for breakwater facing

HIGHWAYS
10 Highway Research Board meeting takes up road problems
16 Heaped loads, fast cycles speed expressway job
80 Scrapers move rocky soil for turnpike connection
88 Horizontal drains stabilize slopes economically
94 Crushing, blending in high gear for turnpike base course
110 Crusher turns out subbase, base, hot-mix aggregates

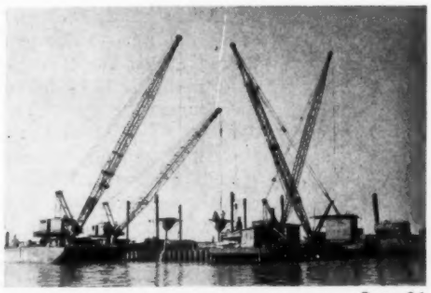
PAVING
22 Monolithic curb, surface laid by bituminous finisher
34 Grading, paving, bridge work completes bypass projects
42 Plastic foam is used in forming construction joints

MANAGEMENT
46 The construction contract divides damage responsibility
120 The Engineering Department: Concrete and form work

TUNNEL
74 Six headings are driven for hydroelectric tunnel

DEPARTMENTS
50 Avoid Legal Pitfalls
132 Construction Camera
13 Convention Calendar
21 Distributor Doings
4 Editorial
148 Labor Review
104 Manufacturer Memos
44 Names in News
162 Surveying Washington

An index of articles published in *CONTRACTORS AND ENGINEERS* during 1956 is available on request.



Tremie pours for Galveston Bay causeway. Page 26

Fill pumped for dispcsal area. Page 66

Base preparation for Oklahoma turnpike. Page 94

Rigging guides atomic vessel in place. Page 116

editorial

Pipelines, power, and public works

During the past month, the road-building segment of the construction industry has been getting most of the attention of America's great fraternity of constructors. Another look at the over-all picture, however, brings into focus other types of construction that also need attention in 1957.

The Middle East crisis, for instance, has made us acutely aware of inadequate pipeline facilities in this country. With the Suez blocked, the burden of supplying oil to Europe fell on the United States. About 90 per cent of oil for the free world comes from this country, Venezuela, and the Middle East. Supply from the last named was cut off sharply, Venezuela had no surplus reserves on hand, and this country was called on to keep European industry alive.

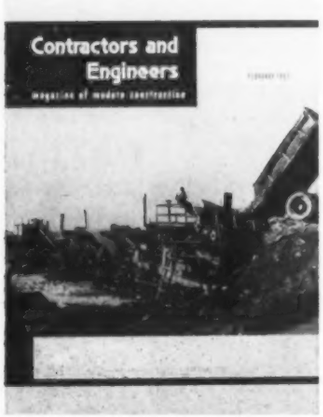
Fortunately, we have an excess capacity of crude oil at the wells. While our tanker fleet could stand enlargment, some rerouting of vessels was expected to be enough to help Europe meet the emergency. But then we ran into a bottleneck in transporting great volumes of oil from wellheads in the Southwest to refineries and deep water ports on the East Coast. To eliminate this bottleneck, the pipeline industry must lay transmission lines from its new domestic fields or from still-producing older fields to deep water terminals. If private industry does not accept the responsibility, the government may have to see that the pipelines are laid as a defense measure.

In his State-of-the-Union message to Congress last month, President Eisenhower emphasized "making the best use of each drop of water from the moment it touches our soil until it reaches the ocean, for such purposes as irrigation, flood control, power production, and domestic and industrial uses. . . ." A program that satisfies this plea is the multi-purpose Upper Colorado River basin project that should see marked progress toward its goal in the twelve months ahead. Five states—Colorado, Wyoming, Utah, New Mexico, and Arizona—including a portion of the "dust bowl" area in the Southwest, will benefit markedly when the proposed three big new dams are constructed to impound water for generating power, reclaiming land, preventing floods, and supplying needed potable water to sustain a future population in this sparsely settled region.

The President's appeal "that each of our great river valleys should be considered as a whole" is reflected in a plan that a Pacific Northwest public power group has proposed for federal construction of $2½ billion worth of power and flood control dams on the Columbia River and its tributaries. In this program, ten dams would be constructed over a 20-year period by a public regional power agency known as the Columbia River Development Corp. The Northwest Public Power Association, composed of 102 consumer-owned electric systems, is backing legislation that would finance the program through power revenue and the issuance of electric revenue bonds. The Association would have Congress authorize a high dam on the Snake River at Hell's Canyon on the Oregon-Idaho border. Such a project would conflict with Idaho Power Company's program now under way to build three low-level dams along this stretch of the river. However the issue is resolved, the states of Washington, Oregon, Montana, and Idaho should benefit from the additional electric power resources that are bound to be developed soon.

Conflicts between public power groups and private industry bring to mind the differences that constantly arise from lack of coordination in planning federal, state, and local public works. Some 40 agencies of the federal government, together with over 100,000 of lower governmental jurisdiction, are constantly planning public works that many times are not in harmony with one another. Wasted effort should be eliminated if the federal government took a more responsible position in developing coordination in public works planning. Needed improvements would then receive preference, costs should be lower, mistakes in site locations could be avoided, and duplicate developments abolished.

With a $64.4 billion potential of construction estimated for this year, according to the Associated General Contractors of America, public works for 1957—federal, state and local—will amount to around $15.2 billion. Careful planning is essential to get the most construction for every available dollar.



Base-course rock for the Oklahoma Northeastern Turnpike streams from this crushing and screening setup at a rate of 110 to 140 tons per hour. Rock dumped by the International truck goes through a Cedarapids 25×40 jaw crusher and a Cedarapids Commander secondary plant to a 21-ton surge bin.
Page 94

CONTRACTORS AND ENGINEERS

issued monthly by

BUTTENHEIM-DIX PUBLISHING CORPORATION
New York, N. Y.

President and Publisher • Donald V. Buttenheim
Editor • William H. Quirk
Field Editors • Ralph Monson, Anthony N. Mavroudis, William A. Allen
Assistant Editors • William J. Dowdell, William T. Darden, Bert Berger
Associate Editor • Catherine J. Hearn
Research Director • Frank Kypreos
Art Director • Henry E. Salloch

Chairman of the Board • Edgar J. Buttenheim
Vice President • George S. Conover
Secretary and Treasurer • Edwin Wagner
Business Manager • Edward George Allen, Jr.
Pacific Coast Manager • Albert T. Miller
Southern Sales Manager • Curtis R. Buttenheim
Production Manager • Edna A. Jones

470 Fourth Ave., New York 16, N. Y.
Myron MacLeod
E. G. Allen, Jr.
Don Daily — *MUrray Hill 5-9252*
Roy T. Wagner
James Stack

Chicago 6, Ill.
2111 Daily News Bldg.
George S. Conover
Warner H. Robinson — *CEntral 6-2855*
William J. Adams

Grosse Pointe 30, Mich.
808 Neff Road
Arthur B. Burgan — *TUxedo 1-6190*

Cleveland 14, Ohio
603 The Arcade
Robert C. Burton — *CHerry 1-1755*

Los Angeles 27, Calif.
2238 Ben Lomond Drive
Albert T. Miller — *NOrmandy 5-5143*

Lookout Mountain, Tenn.
121 North Hermitage
Curtis R. Buttenheim — *TAylor 1-2853*

Acceptance under Section 34.64 P. L. & R. Authorized at Lancaster, Pa. Vol. 54, No. 2
$4 a year, 50 cents a copy in the United States and Canada. $7 a year in other countries.
©1957 by the Buttenheim-Dix Publishing Corp.

Zara Contracting Co., Hicksville, Long Island, N. Y., spaced the plywood panels at 2-foot intervals to shore the walls of a sewer trench. The 8-man digging crew averaged 200 feet per 8-hour day. At far right, just behind the trenching machine, a workman places a 5-foot 3×8 horizontal wale between the vertical 8-foot 3×8 uprights. The uprights are nailed to 4×8-foot Douglas fir plywood panels.

Sewer trench shoring made easier by plywood panels

By using 4×8-foot Douglas fir plywood panels for shoring sewer trench walls, a Long Island, N. Y., contractor found that he could reduce his digging crew from 10 to 8 men, eliminate expensive braces, and reduce material costs by re-using the panels. The Zara Contracting Co., Hicksville, placed 4×8-foot panels of ⅝-inch exterior-type fir plywood upright on both sides of the sewer ditches. This substituted for 2×10-inch shoring stock every 4 feet.

Installing panels

The crews placed the panels opposite each other every 2 feet, after a section of wall had been cut by the trench-digging machine. Nailed to the center of each panel were vertical 8-foot 3×8 uprights. Five-foot 3×8 horizontal wales were forced between the vertical uprights about two feet down from the top of the plywood panels. Finally, 3-foot 2×8 horizontal wales were forced into the same position about 3 feet up from the bottom of the panels. All the wales were nailed to the bottom of the vertical uprights. The lower wale was removed as each section of sewer pipe was installed.

The 4×8-foot panels proved effective in retaining the weakest area of the trench wall, and held the entire depth of the trench wall safely. This shoring method permitted the crews to work faster and cover a larger area than when 2×10's were used. This in turn made it possible for the contractor to use an 8-man digging crew, instead of the usual 10 for a job of this nature, and to eliminate the need for a foreman of a trench machine crew.

The firm saved money on material costs as well as labor. The plywood sheeting, while eliminating many expensive braces, provided the necessary strength required to brace tons of earth. THE END

Modernizing another 40 miles of US Route 1

The conversion of US Route 1 south of Jacksonville into a divided highway has been one of Florida's major, long-range projects. Most recent developments in this program have been the dualization of 20 miles of US–1 between Jacksonville and St. Augustine and of a similar mileage near Titusville. In both instances, the pavement constructed on these sections of the nation's principal north-south traffic artery was heavy-duty, hot-mix Texaco Asphaltic Concrete.

The same rugged plant-mixed type of Texaco Asphalt pavement has been laid on 30 miles of the new Massachusetts Turnpike. It will also be constructed on a substantial portion of the Connecticut Turnpike.

On the basis of durability, riding quality and cost, hot-mix Texaco Asphaltic Concrete paving is a logical choice for the Interstate Highway System.

Helpful information on Texaco Asphaltic Concrete, as well as other heavy-duty, intermediate and low-cost types of Asphalt construction, is supplied in two booklets, copies of which may be secured with no obligation by writing our nearest office.

ENGINEERING · RESEARCH · EDUCATION · THE ASPHALT INSTITUTE · MEMBER

Photos show hot-mix Texaco Asphaltic Concrete pavement under construction and completed on 20-mile section of US Route 1 between Jacksonville and St. Augustine, Fla., now a divided highway.

CONTRACTORS: Marion Construction Company, Ocala, Fla. (Jacksonville-St. Augustine project); Macasphalt Corporation, Lakeland, Fla. (Titusville project)

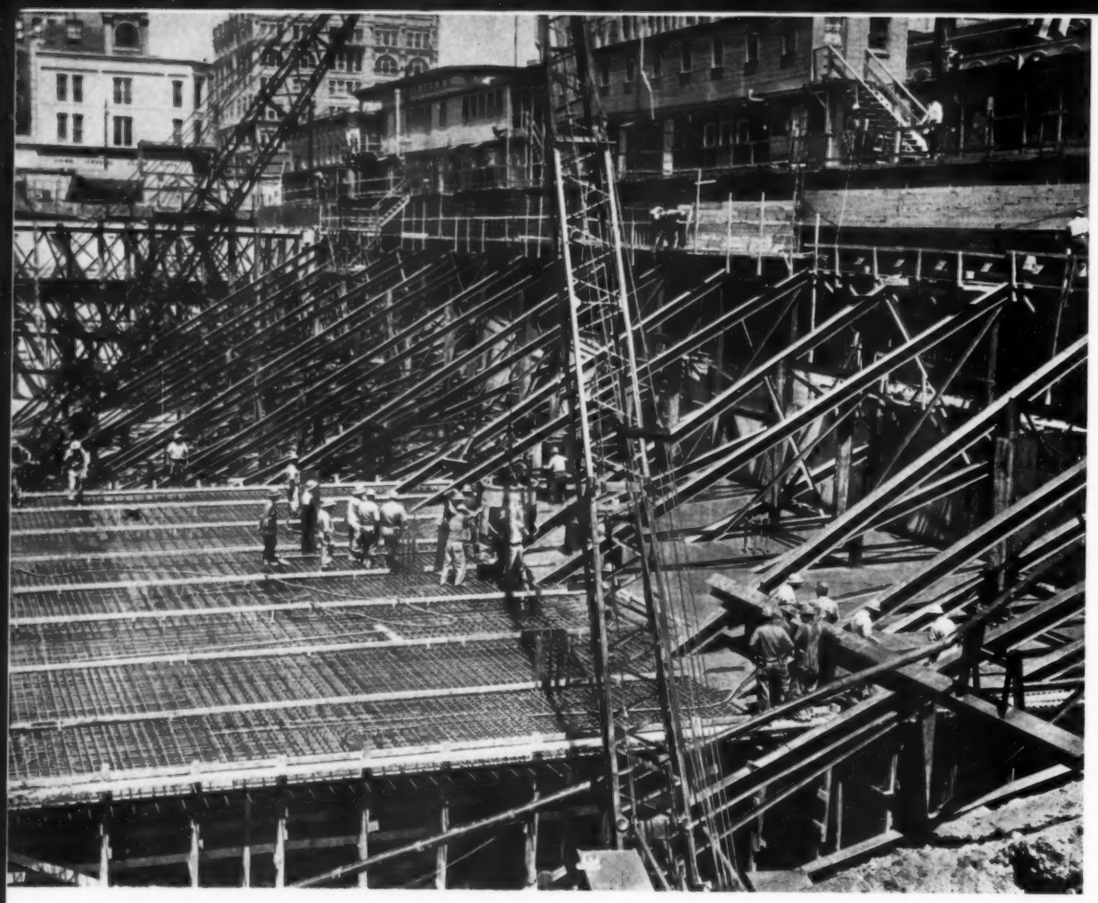
THE TEXAS COMPANY, Asphalt Sales Div., 135 E. 42nd Street, New York City 17

Boston 16 • Chicago 4 • Denver 1 • Houston 1 • Jacksonville 2 • Minneapolis 3 • Philadelphia 2 • Richmond 19

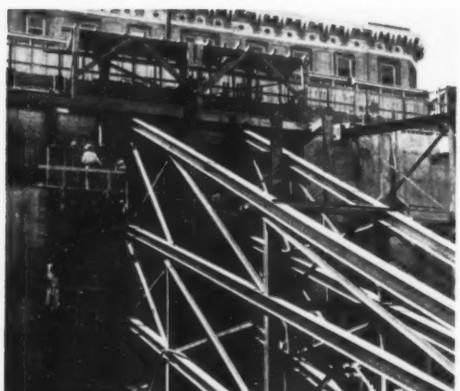
TEXACO

TEXACO ASPHALT

For more facts, use Reader-Reply Card opposite page 18 and circle No. 202



Two cranes in the excavation place concrete from either side of the slab. Workmen are ready for another Gar-Bro bucket to empty concrete over the reinforcing.



The carpenter crew sets forms for the 38-inch-thick reinforced-concrete wall of the basement.

Shoring, forming innovations mark work on 4-story basement

Most of the people in Denver will never see the most unusual part of the $35 million Court House Square Development in the city—a gigantic four-level basement with 17 acres of floor space. This will be enough to park from 2,000 to 2,500 cars and still provide storage space for the development's 18-story hotel, five-story department store, and single-level structure for retail shops.

Measuring 50 feet deep and 400× 481 feet in outside dimension, the basement is so different from others that Webb & Knapp Construction Corp., Denver, had to use different construction methods and new approaches to unique problems.

With one Gar-Bro bucket filled and about to be hoisted to a pour, a Challenge truck mixer chutes concrete to another waiting bucket.

An Allis-Chalmers HD-5 uses a Tracto-Shovel front-end loader to clear excess dirt from the site and load it out to a White truck.

Excavation of 481 X 400 X 50-foot basement done in four steps; unusual forming used for 38-inch-thick reinforced-concrete walls

A portion of the 2,500-car underground garage rises in the center of the 50-foot-deep basement, while excavation continues around the perimeter of the site. A wale-and-strut system of H-beams runs from the bottom slab to the steel H-beam sections ringing the excavation.

Excavation in four steps

Excavation of the huge basement, worked out by designers, engineers, and job officials, was done in four steps. First, the inner prism of the basement—far from adjacent streets—was excavated to full depth with the sides sloping at a safe angle of repose.

Second, footings and the central portion of the 12-inch-thick reinforced-concrete floor slab were constructed. Third, vertical 12-inch, 53-pound steel pile H-beam sections were driven to a 50-foot penetration into the Denver shale formation on which the foundation rests. These piles were driven on 6-foot centers around the entire building line perimeter.

Fourth, as the remaining excavation was completed, a wale-and-strut system of steel H-beams was placed so that it reached from the central concrete slab to the top of the vertical steel piles. At the same time, breastboards of varying thicknesses were placed to retain the vertical earth walls.

Start of excavation

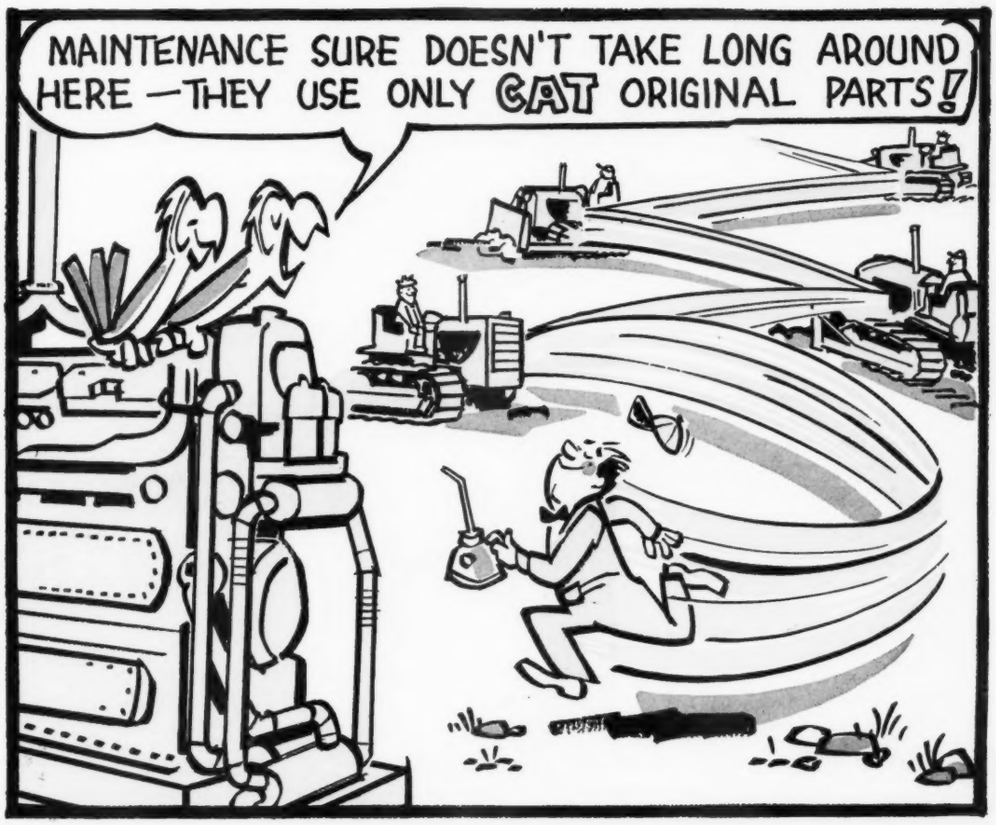
Initial excavation—involving about 325,000 yards of material—covered about 70 per cent of the dirt work. This material was dug out by a rented Bucyrus-Erie 38-B, which was used as both shovel and dragline, along with another shovel and a P&H 655 dragline. Since about 70 per cent of the earth was found to be an excellent river-bottom alluvium suitable for the manufacture of concrete, Webb & Knapp bought a sand and gravel plant about six miles from downtown Denver, trucked the material to the plant, processed it, and stored it so that the material could be used in the concrete for the structure. Silver and gold were also recovered during this unique salvage operation, by a set of riffle tables at the sand manufacturing equipment.

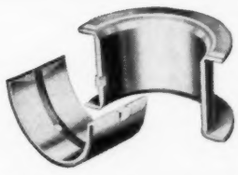
Several drainage sumps, enclosed by a steel sheet pile cofferdam 18 feet square, were located over column centers to unwater the initial excavation. These sumps reached an average of 12 feet down into the Denver shale formation.

A special template, constructed of 6-inch channel sections and 6-inch pipe columns latticed with angle-iron bracing, speeded the driving of sheet piling. This frame was 12 feet high and congruent with the sump perimeter. The piles were driven by a McKiernan-Terry double-acting hammer powered by steam.

Since conventional jackhammers with moil points were slow and cumbersome when it came to excavating the semi-solid Denver shale in these

(Continued on next page)





An engine bearing—not big, but mighty important. If it's a CAT* bearing, it's an *exclusive combination* of aluminum alloy—extra strong with just the right degree of hardness. But if it's a "look-alike" bearing—who knows?

Be sure to get parts you can trust—from your Caterpillar Dealer. He always has the *exact* part you need. Play it safe—don't be fooled by "look-alikes."

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 203

(*Continued from preceding page*)

sumps, the rocky material was loosened with a 6-inch mandrel-type shaft 3½ feet long, which tapered to 1 inch at the point. This point, hard-faced with Stellite, was plug-welded and knee-braced to a 2-inch steel anvil plate that fit the McKiernan-Terry 9-B-3 pile hammer. Operated free of leads, this heavy device soon cut 60 per cent in the time and expense that this operation would have cost with jackhammers.

The shaft was driven into the shale and the weight of the hammer acted as a lever to break chunks of rock. These were bailed out by a ¾-yard clam bucket. The same system was used to excavate footings in the rock.

The drainage sumps were finished by a 12-foot-square prefabricated timber crib, sheeting placed vertically, and a cylinder of No. 4 galvanized wire mesh centered in the cell. The space between the steel sheeting and the timber crib wall was filled with ¾-inch crushed stone before the steel sheeting was pulled. Turbine-type deep-well pumps kept the area unwatered from four such sumps.

The sumps also served another purpose during construction: Load tests were conducted which showed that Denver shale will support 30 tons per square foot—three times the amount that is allowed by Denver's Building Code.

The heavy 12-inch, 53-pound steel soldier beams, butted solidly against the 12-inch-thick center floor-slab section, reached to the height of the vertical steel piles that had been driven at 6-foot centers around the building perimeter. Steel H-beam wales were also laid horizontally from the vertical piles. The rakers or struts, which reached from the perimeter wall down to the central floor slab ranged from 54 to 96 feet long.

Breastboards of Douglas fir, used to contain the earth wall just behind the steel piles, were 6 inches thick at the bottom of the excavation and 3 inches thick at the top of the wall. A ¾-inch space left between the breastboards was packed with wheat straw wherever there was a void. This permitted water to drain without eroding any of the retained dirt. The soldier beams and breastboards will stay in place permanently, the breastboards forming one side of the 3-foot 2-inch basement wall.

Excavation of the dirt next to the basement walls, in "production territory" where good yardage was possible, was done by the 38-B and by three Allis-Chalmers HD-5G tractors and front-end loaders. The latter machines were small enough to do productive work under the rakers and struts. A P&H 655 with a clamshell bucket was also used to some extent around the sides of the excavation.

Concrete forming unique

One of the innovations developed for concrete work on the basement walls was a method of form tying with a combination of Nelson studs and Superior coil ties.

The Nelson studs were fastened to the steel members that were to remain in place at 6-foot horizontal centers and 2-foot vertical centers.

The ends of the Nelson studs were threaded to fit a Superior coil tie, so that the wall forms would be held securely during concrete pours. This combination successfully held a designed load of 12,000 pounds per stud.

The breastboards behind the vertical piles were used as one side of the basement wall forming. The inner wall was formed against a ¾-inch plywood face with 2×6 vertical studs. Horizontal strength was provided by wales consisting of doubled 6-inch steel channels placed back to back. The heavy Nelson stud and Superior coil tie assembly reached through the wales and was bolted tight.

In the central portion of the basement, where automobiles will be stored, an ingenious system of forming was used. Round columns were formed by special forms and flat surfaces were formed against Uni-Form panels that were supported by a system of upright timbers. These were spaced so that the 2×4 Uni-Form panels were supported by joists. Alternate upright shores had a 2×4 clamp bolted to the side of the 4×6 girt and the Uni-Form panels rested on these sills. A filler strip was then fitted over the space at the top of the shore. This made it possible for workmen to strip the Uni-Form panels easily, leaving alternate shores in position until the conrete was strong enough for forms to be stripped.

Steel column cap forms were used to form the top of the columns that flare into the floor slabs. The big floor slab pours were formed in sections so that 300 to 400-cubic-yard pours were average.

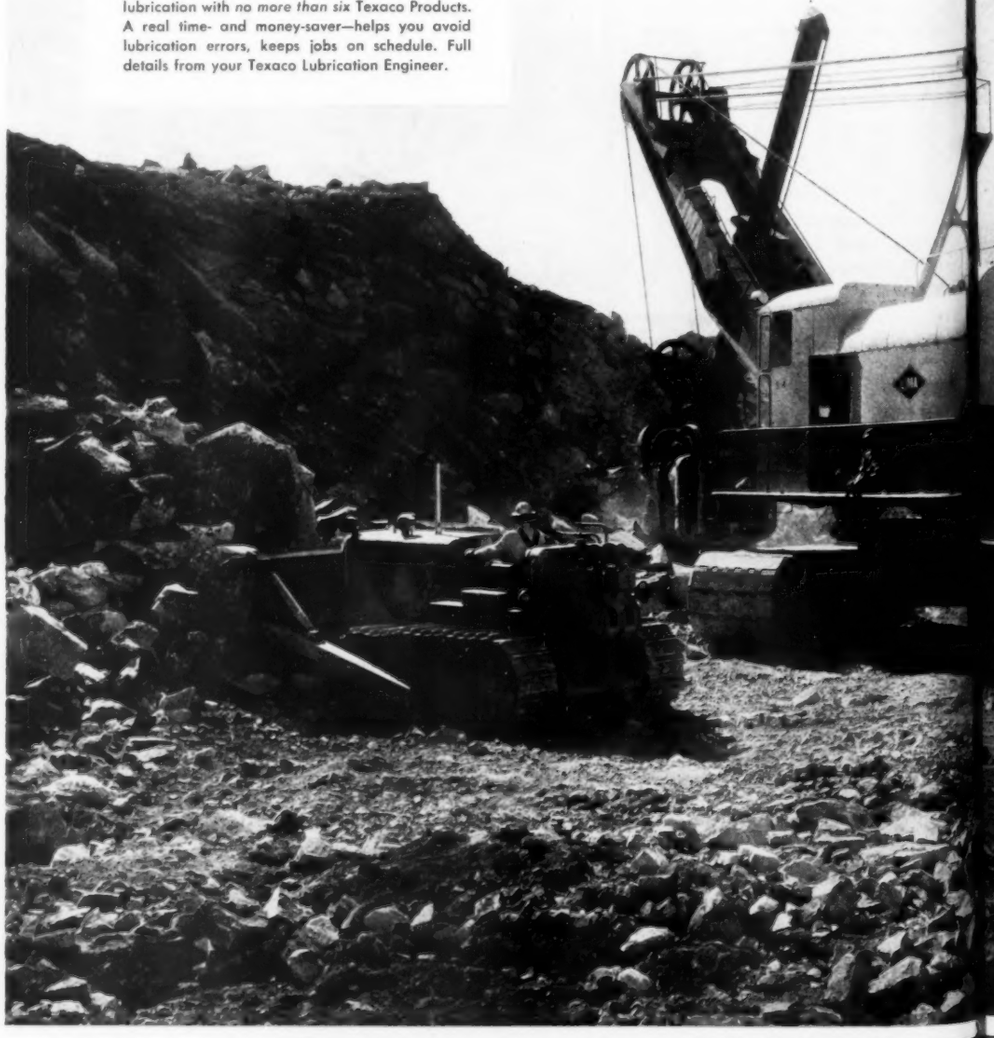
Concrete placement

With Webb & Knapp supplying the aggregate and sand for concrete, two commercial companies formed a joint venture to furnish truck-mixed material to the site. Pre-Mix Concrete Co., and Ready-Mixed Concrete Co., both of Denver, supplied the mix under the name of Allied Concrete Co. Challenge truck mixers were used for delivery.

Most of the concrete was placed by two cranes, one working from each side of a pour in the basement excavation. As they swung the Gar-Bro buckets to the point of placement, their long booms and jibs practically

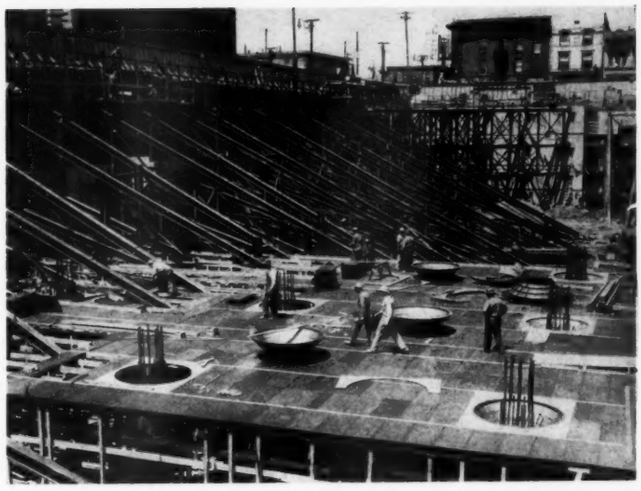
Keeps Equ

TEXACO SIMPLIFIED LUBRICATION PLAN
Whatever the project, you can handle *all* major lubrication with *no more than six* Texaco Products. A real time- and money-saver—helps you avoid lubrication errors, keeps jobs on schedule. Full details from your Texaco Lubrication Engineer.



TEXACO

The forming crew completes laying Uni-Form panels for a deck pour. Steel column caps at the top of the column locations will provide a column flaring into the ceiling. Heavy steel braces from the bank support soldier beams passing through the forms.



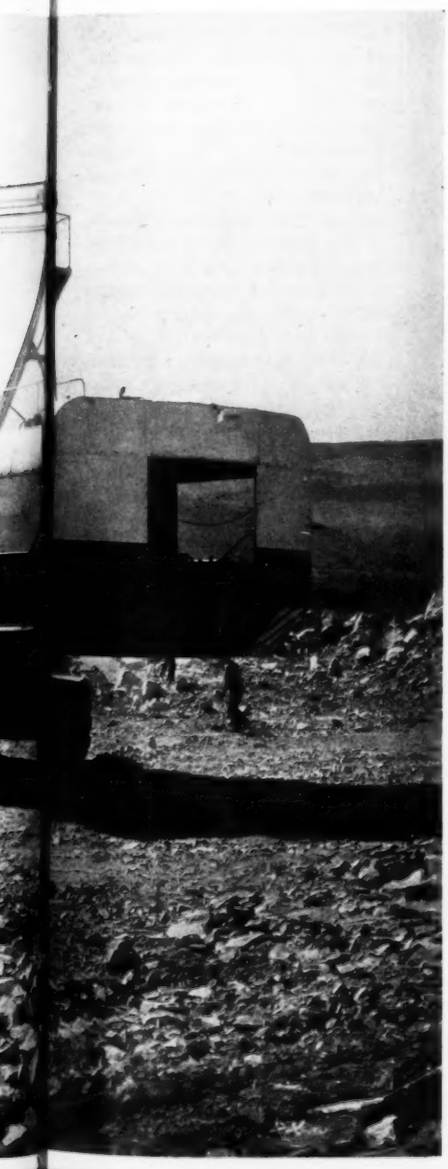
interlaced. After being vibrated internally, the concrete was given an application of Sealtex curing solution. In places where automobiles will travel in the basement, the floors are being given a rough finish; in other places, the concrete is being troweled smooth.

Personnel

Field operations for Webb & Knapp were under T. J. Smith, project manager. James E. Smith was assistant project manager; G. Ellory Lapham, general superintendent; and A. Magee, project engineer.

The consulting engineering firm for the foundation was Moran, Proctor, Meuser & Rutledge, New York. N. Y. Ketchum, Gina & Sharp were associate architects. Structural engineering was done by Weiskopf & Pickworth, with Jaros, Baum & Bolles consulting on plumbing, heating, and ventilating. Smith & Silverman were associated with electrical design, and all architectural supervision was under I. M. Pei, chief architect for Webb & Knapp's architectural division. THE END

Equipment on the job... maintenance costs low



THAT'S THE REPORT wherever *Texaco Marfak* is used. *Marfak's* unique "sealing-in" action gives bearings lasting protection against wear and rust. Heavy loads and rough terrain won't jar or squeeze it out. With *Marfak*, equipment performance is always dependable, maintenance costs are low.

In wheel bearings, *Texaco Marfak Heavy Duty* seals out mud and moisture for thousands of extra miles—extends bearing life—assures safer braking. And no seasonal change is required.

If you prefer a multi-purpose lubricant, *Texaco Marfak Heavy Duty Special 2* is the answer. This new lithium-base lubricant handles chassis, wheel bearing, water pump and other grease lubrication. It pumps easily at low temperatures, always lubricates effectively, resists water washing and stands up in the toughest service.

MORE THAN 650 MILLION POUNDS OF TEXACO MARFAK HAVE BEEN SOLD

And don't forget: Texaco Universal Gear Lubricant EP for smoother-working transmissions and differentials—*Texaco Track Roll Lubricant* to fully protect and prolong the life of crawler mechanisms.

Let a Texaco Lubrication Engineer help you boost efficiency, cut maintenance costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

For more facts, use Reader-Reply Card opposite page 18 and circle No. 204

Foreman to resign AGC post in April

H. E. Foreman, managing director of the Associated General Contractors of America since October, 1940, will relinquish his duties effective April 1. In recognition of Foreman's service, the executive committee adopted a resolution naming him association advisor.

During Foreman's tenure as managing director, the national association grew from 2,500 to more than 6,700 member firms, while the national staff went from 25 to 54 persons.

A member of the association staff since 1929 and an engineer and assistant managing director, Foreman has been a spokesman for the general contracting industry before congress and the government. During World War II, he was active in helping various government agencies mobilize the industry. Currently, Foreman is a member of a number of committees advisory to the Commerce and Labor departments, the President's Conference on Industrial Safety, the Bureau of the Budget, and the Federal Civil Defense Administration.

James D. Marshall, who has been executive director since 1953, assumed full responsibility and authority of chief executive of the association's management in April, 1956. At that time, Foreman retained the title of managing director and has since been acting in an advisory and consulting capacity.

New office structure completed for New York

This month will see a new office building—an 18-story structure at 800 Second Ave.—added to the skyline of New York City.

The city's tallest lightweight concrete office building, the new structure contains more than 8,295 cubic yards of concrete, exclusive of that needed for the foundation.

The estimated traffic of 2,500 people per day in the building will be handled by six Autotronic passenger elevators, which may be used as operatorless or operator-type elevators.

Research Board discusses problems of road program

With the interest of the nation focused on the rapid expansion of highway facilities, the Highway Research Board, a national cooperative organization of highway engineers and technologists, staged its biggest annual gathering at its 36th yearly meeting last month in Washington, D. C.

More than 1,600 highway administrators, engineers, and highway transportation and safety experts from throughout the United States and Canada, together with representatives of national organizations, industries, federal agencies, county and city highway departments, attended the four-day convention in the Sheraton-Park Hotel, January 8 to 11.

More than 200 technical papers were presented at 38 general sessions of the meeting. These papers covered such areas as design and construction of roads; the economic and administrative problems of providing good highways; technical problems in soils and materials; traffic and vehicle operation; nighttime visibility and sign legibility; and many other problems of transportation and modern urban development. They were prepared by staff members of several colleges, research workers in state highway departments, and representatives of organizations and agencies concerned with highways. Many of the topics discussed dealt with problems connected with the rapid expansion of facilities to be constructed during the next decade under the federal highway legislation enacted during 1956.

Annual awards

Two annual awards were conferred at the opening general session. The Highway Research Board Award, for the best paper presented at last year's annual meeting, was given to Chester A. McDowell, Senior Soils Engineer of the Texas Highway Department at Austin, Texas. McDowell's paper was entitled "Inter-Relationship of Load, Volume Change and Layer Thickness of Soils to the Behavior of Engineering Structures". The award winner has also invented a special slide rule to facilitate computations connected with formulae developed in his paper.

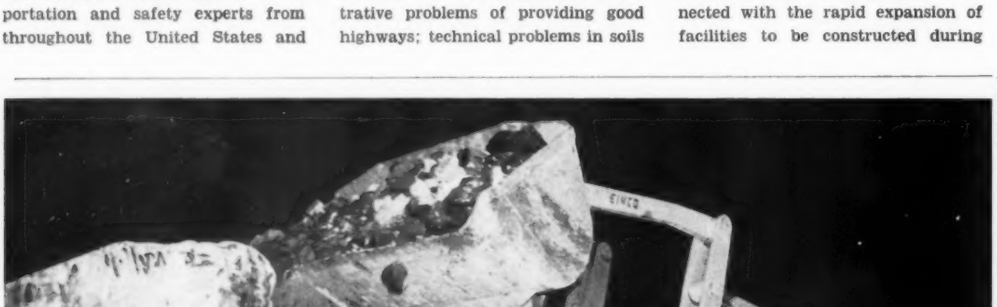
The Roy W. Crum Award, named in honor of the late director who served HRB for 23 years, is given in recognition of outstanding achievement in the field of highway research. It was presented to Francis N. Hveem, Chief of the Materials and Research Department of the California Division of Highways. Hveem has attracted attention by his independent field research in design and control of bituminous mixtures for highway surfacing. Over the years he has developed many methods and items of equipment, including numerous methods of selecting and handling materials in pavements, methods of evaluating stability and riding qualities of pavements, and extensive investigations of corrosion on steel in bridges.

Highway test project

Prof. Kenneth B. Woods, HRB chairman and Head, Department of Civil Engineering at Purdue University, Lafayette, Ind., reported on the $14 million highway-test project now under construction near Ottawa, Ill. According to Prof. Woods, the grading and base work on the project was completed last year; the paving, to be done this coming season, will be ready for testing in the fall. The HRB chairman pointed out that this test project, sponsored by the American Association of State Highway Officials, is being administered by the Highway Research Board and is its most important undertaking.

"We are in the midst of the largest highway construction program in the history of the country," Prof. Woods declared, "and we are constructing the largest of all highway field experiments—the AASHO Test Road—for the purpose of improving our concepts of highway design and highway economics." Prof. Woods reminded those attending the general session that a year ago the project, with its six test strips for flexible and rigid pavements, was still in the planning stage.

The test strips, which contain more than 800 different designs and con-



EIMCO 105 PRODUCTIVE VERSATILITY IN ACTION!

NEW! FRONT END LOADER

Here's the latest addition to the 105 wide-range family of rugged earth-moving tools.

In loading applications where physical and haulage conditions make its use more practical . . . here is a front end loading mechanism that gives you extra strength for the most severe job.

Large, double-acting hydraulic boom cylinders provide ample power to hoist loads weighing up to 15,000 lbs. to full height. Boom and bucket controls may be operated simultaneously.

To fill the big (2½ yard) bucket, this loader develops 25,000 lbs. digging force at the lip. 40,000 lb. pry-out force and 40 degree bucket tip-back at ground level gets full bucket loads, minimizes spillage. It carries loads close and low for maximum stability.

It operates in 9' 6" headroom . . . discharges into haulage units up to 14'.

Exclusive features of the hydraulic system provide an extra margin of protection against mechanical delays.

Bulldozer

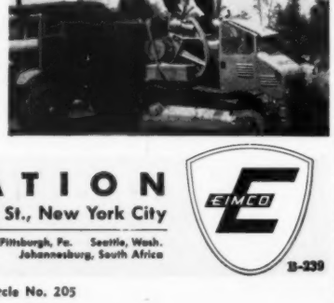
Dozer blade attachments are designed to make full use of the extra-production features of the 105. In broad usages such as cutting haul roads for logging outfits . . . pioneering in shale and hard rock . . . clearing fire paths for the Forest Service . . . the Eimco 105 Bulldozer has proven its high-capacity ability the world over.

All attachments are Eimco-built to standard SAE mounting dimensions for the basic 105 Tractor. This means extra performance from every attachment through independent track maneuverability . . . up front visibility . . . power shift operating ease . . . balanced design for maximum stability . . . quality built for dependable on-the-job service.

Excavating Loader

Where digging is extra tough . . . and haulage provisions can be adopted to take full advantage of overhead discharge — the time-proven 105 Excavating-Loader will give you **bonus** loading power at the bucket lip and **bonus** dumping speed to accelerate the entire cycle.

Unique contour of the rugged rocker arms . . . bucket design and smooth, steady flow of engine power transmitted to the bucket lip through the torque converter gets 39,200 lbs. of digging force right where you want it . . . in the pile. Awkward maneuvering to get into dumping position is eliminated in ideal overhead discharge applications.



THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Pittsburgh, Pa. Seattle, Wash. Cleveland, Ohio Houston, Tex. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

EIMCO B-239

For more facts, use Reader-Reply Card opposite page 18 and circle No. 205

More than 200 papers are presented at 38 sessions as HRB holds 36th annual meeting in Washington

structions, will be subjected to the traffic of trucks with various axle loads over a two-year period. Highway engineers expect the results of the test to have a great influence on the design of future roads and a possible effect on the nation's highway tax structure.

Progress report

W. B. McKendrick, Jr., project director of the AASHO road test, discussed its organization and administration. A former chief engineer of the Delaware State Highway Department, McKendrick stated that at the peak of operations last fall, a total of 140 people were associated with the project. Of these, 114 were in the Construction and Materials Laboratory branches.

Research and testing on the project was described by William N. Carey, Jr., chief engineer for research on the AASHO road test. His report dealt with completing the experiment design in cooperation with an advisory panel; establishment of a materials laboratory and the development of special techniques for high-speed soil testing in connection with the control of embankment construction; and planning for the research phase of the project.

A progress report covering design and construction of the test strips, 1955–1956, was presented by W. E. Chastain, Sr., Engineer of Physical Research, Illinois Division of Highways. The work thus far has been divided into four contracts: (1) fabrication of steel for four grade-separation structures; (2) two major drainage structures; (3) substructures and erection of steel superstructures for the four grade-separations, and substructures for the test bridges; (4) grading.

On a low combination bid for contracts 3 and 4, the joint venture of S. J. Groves & Sons Co. and Arcole Midwest Corp. was awarded a $2,025,000 contract. Nearly 1¼ million yards of earth were moved last year in grading operations. Density controls in the embankment were strict, since a high degree of uniformity of embankment support and strength was essential if differences in the behavior of the individual pavement sections are to be correlated with pavement thickness and type.

The Illinois Division of Highways is preparing plans and specifications for the construction of the pavements, both flexible and rigid. According to present plans, paving will get under way in the spring in order to be ready for testing in the fall.

Lost production

A feature at a Maintenance-Construction session was the showing of a new sound movie entitled "Lost Production". Unstaged and unrehearsed,

(*Concluded on next page*)

The Highway Research Board Award for the best paper presented at last year's annual meeting was given to Chester A. McDowell (left), of the Texas Highway Department. The Roy W. Crum Award was presented to Francis N. Hveem (right), of the California Division of Highways.

NOW There's no job too tough for tubeless tires

Tractor shovel on Goodyear tubeless tires scoops up 10-inch concrete slabs, near Lansing, Michigan.

HERE YOU SEE a sample of what tubeless tires have to take—in today's mammoth construction projects. How did tubeless tires get into this picture—and so successfully, too?

One of the biggest reasons is Goodyear's development of the Tru-Seal Rim. This is the rim that has been adopted as standard by the Tire and Rim Association for tubeless replacement of all conventional tires sizes 12:00 and larger.

Tru-Seal is the only practical method yet devised to seal a multiple-piece rim. It adds one more to the many benefits Goodyear's vast tire-building experience brings to rim construction. With Goodyear rims, you profit by such advantages as:

Unusual Strength: Thanks to an exclusive double-welding process, and added support at points of greatest stress, present-day Goodyear Rims are far stronger than previous rims.

Ease of Tire Mounting: No tube and flap troubles.

Special Tools: Goodyear alone provides both hydraulic and hand tools especially made for off-the-road equipment.

Bond-a-Coat Finish—This protective coating affords long-lasting resistance to rust and corrosion.

If you have a rim problem, why not talk it over with the G.R.E. (Goodyear Rim Engineer). He'll save you time and money by helping you select the type and size of rim best suited to your needs. Write him at Goodyear, Metal Products Division, Akron 16, Ohio, or contact your local Goodyear Rim Distributor.

New Tru-Seal Rims—for sizes 12.00 and up, including all earth-mover and grader sizes. This rim is similar to multiple-piece rims now in use—PLUS airtight Tru-Seal rubber ring which compresses into sealing groove when tire is mounted.

Buy and Specify GOODYEAR

Tru-Seal—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

MORE TONS ARE CARRIED ON GOODYEAR RIMS THAN ON ANY OTHER KIND

For more facts, use Reader-Reply Card opposite page 18 and circle No. 206

(*Continued from preceding page*)

the film presented actual scenes in color, taken on various highway construction jobs, showing minor delays, and other factors affecting production rates of highway construction equipment. The movie was prepared by the U. S. Bureau of Public Roads, and its showing was sponsored by the HRB Special Committee on Highway Equipment. The film is available from the Bureau of Public Roads for interested groups.

Job operations covered in the movie included shovel loading, tractor-scraper combinations in earthmoving, bituminous paving, and concrete paving. According to the commentary, the major factor resulting in shovel downtime on the jobs that were filmed was the lack of trucks. This shortage in hauling equipment was the cause of one-third of all delays. The reason for most delays of earthmoving with tractor-scraper units was attributed to a wait for push-tractors to assist with the loading.

As regards hot-mix paving, the film indicated that loss of production did not take place at the paving site but at the asphalt plant. The paver or finishing machine, in the examples shown, had greater productive capacity than the hot-mix plant. Stopwatch timing indicated that the average plant lost about three hours a day in minor stoppages. The chief factors in the halt of plant production included inadequate dryer capacity, faulty proportioning at the cold elevator feeding the dryer, and a wait for hauling units.

Time studies of concrete paving jobs covered showed that the pavers averaged only about two-thirds of their total capacity. The loss of production was the result of small delays in batch truck maneuvering; slow dumping into the paver skip; inefficient operation of the paver; and poor layout of the batch plant, which required trucks to back under rather than drive under and through the bins.

Third type of cement

Two separate papers, presented at a session on Design, discussed the development and application of a resinous skid-resistant surfacing material for highways. Known as Relcote, the material was pioneered by Reliance Steel Products Co., McKeesport, Pa., six years ago and has been under development in a joint program between Reliance and Shell Chemical Corp. during the past 2½ years.

One of the papers, "The Development of Resinous Skid-Resistant Surfaces for Highways" by H. S. Nagin of Reliance Steel Products Co. and T. G. Nock and C. V. Wittenwyler of Shell Chemical Corp., stated that the new experimental composition constitutes a third type of cement that will supplement the portland cement and bituminous cements that have long been used and proved in roadbuilding. This resinous cement is based on the epoxy resins in the form of a liquid polymer which, on the addition of a curing agent or catalyst, sets up to a hard, tough, adhesive solid. At the present time, the base resin is relatively expensive. Except for special purposes, its use will probably be limited for some time to application in thin layers, ⅛ to ⅜-inch thick, as a surfacing over existing portland-cement or bituminous-concrete roadways.

According to the joint authors, high skid resistance is a primary objective of this material. However it also provides good wearing qualities and protects the roadway from water, deicing salts, and freezing and thawing in the winter.

The second paper, "Application of a New Non-Skid Surface Treatment on Connecticut State Highways", was prepared by W. M. Creamer, chief engineer, Connecticut Highway Department, and R. E. Brown of the Shell Chemical Corp., Union, N. J. A critical area of portland-cement concrete on Connecticut's Wilbur Cross Parkway was resurfaced with the resinous binder mixed with sharp, crushed quartzite sand. After this material had been laid and screeded, but while it was still fluid, No. 30 mesh surfacing grit (fired aluminum oxide) was manually applied and the surface rolled.

The authors concluded that the material shows great promise in protecting pavement surfaces from environmental deterioration and in providing a non-skid wearing course to enhance the safety and driving comfort of motorists.

Photogrammetry and aerial surveys

A well attended Design session heard a panel discussion on photogrammetry and aerial surveys. William T. Pryor of the Bureau of Public Roads, introducing the subject, listed 22 advantages of aerial surveys. The photographic mission was described in detail by John H. Wickham, Jr. of Aero Service Corp., Philadelphia, Pa. Joel D. Aron of International Business Machines Corp. discussed the engineers' approach to electronic computing methods. Other phases of the subject were taken up by Robert D. Miles of Purdue University, and E. S. Preston, Ohio Department of Highways.

THE END

A list of coming conventions appears on page 13.

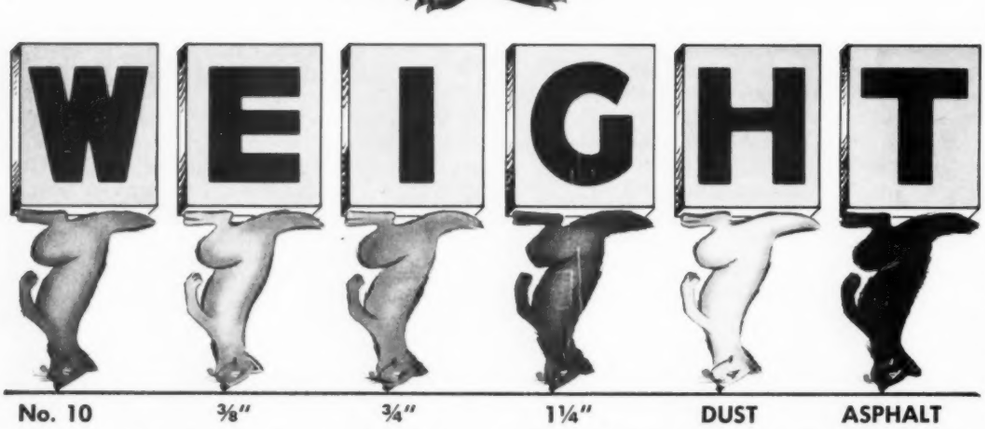
DEPENDABLE

Simplicity Automatic

4000 lbs. to 8000 lbs. . . . BINDER TO TOP? *FLIP ONE SWITCH!*

QUICK as a cat

can wink...



No. 10 | ⅜" | ¾" | 1¼" | DUST | ASPHALT

RIGHT ON THE NOSE!

Simplicity *Automatic* Equipment is available *ONLY* on Simplicity asphalt plants, new or old.

THE SIMPLICITY SYSTEM CO., Chattanooga, Tenn.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 207

Convention calendar

February 11–14 National Sand and Gravel Association and National Ready-Mix Concrete Association
Forty-first Annual Meeting of the NSGA and the Twenty-seventh Annual Meeting of the NRMCA, Hotel Statler, Los Angeles, Calif. Vincent P. Ahearn, executive secretary, NSGA-NRMCA, Munsey Bldg., Washington 4, D. C.

February 15–16 National Society of Professional Engineers
Spring Meeting, Hotel Francis Marion, Charleston, S. C. Paul S. Robbins, executive director, NSPE, 2029 K. St. N. W., Washington 6, D. C.

February 18–22 American Society of Civil Engineers
Jackson Convention, Heidelberg Hotel, Jackson, Miss. Don P. Reynolds, assistant secretary, ASCE, 33 W. 39th St., New York, N. Y.

February 19–20 Concrete Short Course
Meeting, New England Engineering Bldg., Nashville, Tenn. Wm. H. Rowan, CSC, Box 1603, Vanderbilt University, Nashville, Tenn.

February 20–22 Minnesota Federation of Engineering Societies
Meeting, St. Paul Hotel, St. Paul, Minn. K. A. Feucht, executive secretary, MFES, 619 Guardian Bldg., St. Paul, Minn.

February 25–26 Georgia Highway Conference
Sixth Annual Conference, Georgia Institute of Technology, Atlanta, Ga. Radnor J. Paquette, GHC, Georgia Institute of Technology, Atlanta, Ga.

February 25–27 Association of Asphalt Paving Technologists
Annual Meeting and Technical Session, Atlanta Biltmore Hotel, Atlanta, Ga. Ward K. Parr, secretary-treasurer, AAPT, 1224 E. Engineering Bldg., Ann Arbor, Mich.

February 25–28 American Concrete Institute
Annual Meeting, Statler-Hilton Hotel, Dallas, Texas. Wm. A. Naples, secretary-treasurer, ACI, 18263 W. McNichols Road, Detroit 19, Mich.

February 26–28 Illinois Highway Engineering Conference
Forty-third Annual Conference, University of Illinois, Urbana, Ill. John W. Hutchinson, IHEC, 303 Civil Engineering Hall, University of Illinois, Urbana, Ill.

February 27–March 1 Association of Highway Officials of North Atlantic States
Meeting, Hotel Traymore, Atlantic City, N. J. Kenneth D. Rice, secretary, AHONAS, c/o State Highway Department, 1035 Parkway Ave., Trenton, N. J.

February 28–March 1 Highway Engineering Conference of University of Colorado
Thirtieth Annual Conference, University of Colorado, Boulder, Colo. Roderick L. Downing, conference chairman, HECUC, 207 Engine Bldg. No. 1, University of Colorado, Boulder, Colo.

February 28–March 1 Illinois Traffic Engineering Conference
Ninth Annual Conference, University of Illinois, Urbana, Ill. John E. Baerwald, ITEC, 401 Civil Engineering Hall, University of Illinois, Urbana, Ill.

March 3–9 American Society of Photogrammetry and the American Congress on Surveying and Mapping
Twenty-third Annual Meeting of the ASP and the Seventeenth Annual Meeting of the ACSM, and Co-Exhibit, Shoreham Hotel, Washington, D.C. J. W. Halbrook and F. G. Williams, co-chairmen, ASP–ACSM, 1515 Massachusetts Ave. N. W., Washington 6, D. C.

March 4–6 Utah Highway Engineering Conference
Conference, University of Utah, Salt Lake City, Utah. Grant K. Borg, UHEC, University of Utah, Salt Lake City 12, Utah.

March 5–9 American Concrete Pipe Association
Forty-ninth Annual Convention, Shoreham Hotel, Washington, D. C. Howard F. Peckworth, managing director, ACPA, 228 N. LaSalle St., Chicago 1, Ill.

March 11–14 Associated General Contractors of America
Thirty-eighth Annual National Convention, Statler and Mayflower Hotels, Washington, D. C. James D. Marshall, executive director, AGCA, 1227 Munsey Bldg., Washington 4, D. C.

March 11–15 National Association of Corrosion Engineers
Thirteenth Annual Conference, Kiel Auditorium, St. Louis, Mo. A. B. Campbell, executive secretary, NACE, 1061 M & M Bldg., Houston 2, Texas.

March 18–22 Greater New York Safety Council
Twenty-seventh Annual Safety Convention and Exposition, Hotel Statler, New York, N. Y. Paul F. Stricker, executive vice president, GNYSC, 60 E. 42nd St., New York 17, N. Y.

March 26–27 Earthmoving Industry Conference
Conference, Pere Marquette Hotel, Peoria, Ill. Jack Drais, EIC, 213 Algonquin Road, Marquette Heights, Ill.

March 27–29 South Dakota Highway Short Course
Meeting, South Dakota State College, Brookings, S. Dak. Emory E. Johnson, South Dakota State College, Brookings, S. Dak.

BPR releases new film

A 16-mm sound color film, "Lost Production in Highway Construction", has been released by the Bureau of Public Roads. Based on extensive studies conducted by the Bureau, the film examines minor delays that affect production rates of key units of highway construction machinery—power shovels, scrapers, hot-mix bituminous plants, and pavers.

The film stresses that delays on highway construction projects result in lost dollars for the contractor and higher roadbuilding costs to the public.

Prints of the 30-minute film may be borrowed from Visual Education, Bureau of Public Roads, Washington 25, D. C.

NEW MODEL DB-60 Whiteman POWER BUGGY*

Many improvements on this proved performer!

NEW easy steering and control. Ball bearing is adjustable for wear.

NEW, improved parking brake is located within easy reach.

NEW, sturdier construction of seat bracket gives added strength.

NEW, larger, stronger steel guards give operator added protection.

NEW, heavier solid-casting rear frame makes Power Buggy* huskier, more rugged than ever.

NEW type wheel-clutches engage instantaneously, insuring smooth starts.

Now—place concrete faster, easier, cheaper than ever with the great new Whiteman Model DB-60 Power Buggy.* Sturdier, more dependable than ever with many outstanding improvements *plus* the many important features that have made Whiteman the standard of the construction industry. Call your Whiteman distributor today or send coupon now for complete details.

*Trade Mark

Whiteman THE LEADER IN CONCRETE EQUIPMENT

TRUCK MIXERS | POWER BUGGIES | VIBRATORS | SCREEDING MACHINES | FLOATING-FINISHING MACHINES

WHITEMAN MANUFACTURING CO. DEPT. CE
13020 Pierce St., Pacoima, Calif.
Please send prices, catalogs and name of distributor for
☐ Power Buggies ☐ Screeding Machines ☐ Vibrators
☐ Floating-Finishing Machines ☐ Truck Mixers.
Name.....
Firm.....
Address.....
City.....Zone.....State.....

THE WIDENING OF ROUTE 20 at Waterloo, N. Y., called for the addition, on both sides of the road, of 10-foot-wide lanes slightly higher in elevation than the existing pavement, in order to reduce the over-all crown. This meant that the Serafini Construction Co. had to place wooden forms along the edges of the existing pavement in order to attain the correct elevation. Because the wooden forms could not stand up under the weight and transverse movement of a self-propelled paver, Serafini decided to use a 10-foot-wide Stow vibrating screed. Rubber mounts between the beam and the end roller assemblies supported the beam above the forms and absorbed the vibration before it reached the forms. The Stow screed, pulled by two men, simultaneously struck off and vibrated the concrete. The few rough spots were then touched up with longitudinal floats. Subsequently, the widened roadway was given a blacktop wearing surface. For more information about the vibrating screed circle No. 91 on the Request Card at page 18 or write to the **Stow Mfg. Co.**, 443 State St., Binghamton, N. Y.

More proof that CAT* LOWBOWL Scrapers deliver bigger, faster loads

Handling tough material on the Florida Turnpike, a new DW21 (Series C) Tractor-No. 470 LOWBOWL Scraper averaged 128 pay yd. an hour on a 6900-foot round trip

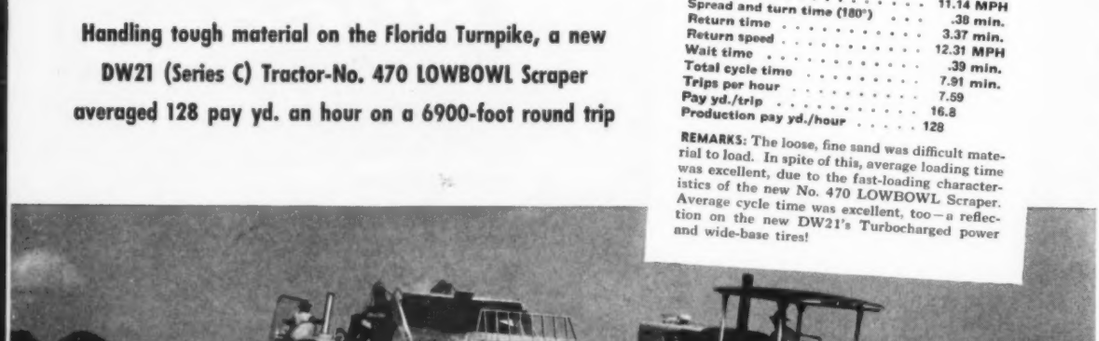
RESULTS OF FLORIDA TURNPIKE JOB TEST

JOB AND LOCATION: Building 3.8 miles of new road on Florida Turnpike, near Hollywood. The job involves moving about 1,000,000 cu. yd. of sand. The contractor: Troup Bros., Inc., Miami. **CONDITIONS:** *Material*—very fine, loose white sand with an estimated shrinkage of 25%, borrow to compacted. *Loading*—D9 (Series D) Tractor with torque converter used for pusher. *Haul distance*—3250 feet over loose to damp, compacted sand, maintained by a No. 12 Motor Grader. Rolling resistance, 100 lb./ton. *Return distance*—3650 feet. *Grades on haul*—400 feet of 1°-3° adverse and 600 feet of 1°-2.2° adverse.

TIME STUDIES

AVERAGE	DW21-No. 470 LOWBOWL Scraper
Load time	.44 min.
Haul time	3.33 min.
Haul speed	11.14 MPH
Spread and turn time (180°)	.38 min.
Return time	3.37 min.
Return speed	12.31 MPH
Wait time	.39 min.
Total cycle time	7.91 min.
Trips per hour	7.59
Pay yd./trip	16.8
Production pay yd./hour	128

REMARKS: The loose, fine sand was difficult material to load. In spite of this, average loading time was excellent, due to the fast-loading characteristics of the new No. 470 LOWBOWL Scraper. Average cycle time was excellent, too—a reflection on the new DW21's Turbocharged power and wide-base tires!



Recent tests on the Florida Turnpike confirm previous reports from other jobs in Iowa, Kansas and New Jersey—the new Caterpillar LOWBOWL Scraper steps up production with bigger, faster loads. Here's proof again that on the job, where results and only results pay off, the new LOWBOWL design delivers a new high in money-making performance.

Says Donald R. Grubbs, Superintendent for Troup Bros., Inc., Miami: "I like the wide-base tires on this new DW21—they help us over this sandy fill. The new LOWBOWL Scraper design also cuts down our loading time. What's more, we've had very little down time with our Caterpillar equipment."

Before you make your next bid, get the full facts about the new LOWBOWL Scrapers. Your Caterpillar Dealer's salesman carries completely documented details about their productive capacity on this and other jobs. Ask him to show them to you!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

The new two-wheel Cat DW21-No. 470 LOWBOWL Scraper. A new four-wheel DW20-No. 456 LOWBOWL Scraper is also available. Both units have a capacity of 25 cu. yd. heaped; 18 cu. yd. struck. Both feature the new Turbocharged, 6-cylinder Cat Engine which delivers 300 HP (maximum output) and 10% more rimpull. New LOWBOWL design loads more material with less resistance clear to the end of the loading cycle. Wide-base tubeless tires, now standard equipment, eliminate an estimated 80% of down time caused by tires.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BIGGER, FASTER LOADS WITH CAT LOWBOWL SCRAPERS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 209

Floor-hardening chemicals

■ A set of five brochures from A. C. Horn, Inc., describes the company's line of floor hardeners for concrete floors. According to the company, Horn floor hardeners are easy to apply, minimize safety hazards, increase the life of the concrete, and reduce maintenance requirements.

Four hardeners are fully described: Hornolith, for chemical hardening; Durafax, for resistance to abrasive wear; Ferro-Fax, for resistance to impact; and Ferem, for diamond-hard wearability. Also included are complete instructions for the application of each of the hardeners.

To obtain these brochures write to A. C. Horn Co., Inc., 10-10 44th Ave., Long Island City 1, N. Y., or use the Request Card at page 18. Circle No. 6.

Winch hoists, accessories

■ Literature describing a line of winch hoists that weigh between 8½ and 15 pounds and have capacities of from ¾ to 2 tons is available from The Lug-All Co. The line consists of 12 models, each with three different rigging arrangements.

The literature shows the unit in various lifting, lowering, pulling, tightening, and bending applications. Complete specifications for all models are included. A full line of accessories for the unit is detailed, and two specialized rigging arrangements, available on certain models, are pictured and described.

To obtain Bulletin 116B write to The Lug-All Co., 355 E. Lancaster Ave., Haverford, Pa., or use the Request Card at page 18. Circle No. 49.

Crane-excavator

■ The Model TM-254 truck-mounted excavator-crane is detailed in a catalog from The Hanson Clutch & Machinery Co. The unit can be used as a crane, clamshell, dragline, shovel, trench hoe, pile driver, or magnet.

The catalog describes the rig in its various applications and discusses the construction features. Such components as the boom hoist, the upper machinery deck, the upper turret bed, and the clutches are given special treatment.

To obtain this catalog write to The Hanson Clutch & Machinery Co., 2000 Miami St., Tiffin, Ohio, or use the Request Card at page 18. Circle No. 48.

Beavers golden awards presented to eleven at second annual dinner

Among those receiving awards from the Beavers last month were, left to right, W. J. Rohan, for management of jobs by Winston Brothers Co., Minneapolis; Ben Arp, for supervision of railroad and tunnel projects; Augustine H. Ayers, for engineering work; and A. F. Garlinghouse, Garlinghouse Brothers Construction Equipment, Los Angeles, for supply.

Eleven men were singled out for the annual Beavers' awards, made for outstanding contributions and meritorious service to the heavy construction industry in the West, at the organization's second annual dinner, January 17, at the Biltmore Hotel in Los Angeles. More than a thousand men, active in the heavy construction field west of the Mississippi, were on hand as the presentations were made. The awards were made in five classifications: management; supervision; engineering; supply; and special.

Two men were given management awards, W. J. Rohan, head of the Winston Brothers Co., Minneapolis, and W. E. Kier of W. E. Kier Construction Co., El Segundo, Calif.

Rohan, who can chalk up 51 years in construction, served as an executive and operations supervisor on a number of important jobs in the West.

Kier, with more than 50 years in the business, is one of the founder members of the Associated General Contractors of America and has served on a number of its committees. His firm has worked with other companies on a number of jobs, including Coolidge and Grand Coulee Dams.

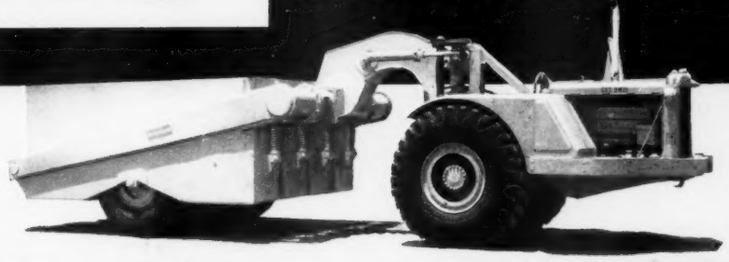
Edwin M. Whipple who retired from the Bechtel Co. in 1950, and Ben Arp, of Utah Construction Co. were given awards for supervision. Whipple has served as superintendent for a number of companies, including Lynn and Guy F. Atkinson Co., The Arundel Corp., H. C. Vensana, and H. E. Leller, while Arp's main work has been on railroads and tunnels in the West.

Engineering awards went to Augustine H. Ayers and Otto W. Peterson. Ayers was chief engineer for the Six Companies on Hoover Dam construction. The consulting work that has since taken him to Spain, Portugal, Africa, Australia, and New Zealand, is in addition to his work in the United States. Peterson, manager of the General Construction Department of Pacific Gas & Electric Co. for 30 years, has had direct supervision of the construction of the major portion of the company's $800 million expansion program since World War II.

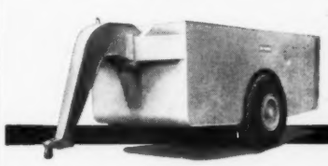
A. F. Garlinghouse, of Garlinghouse Brothers Construction Equipment, Los Angeles, and A. J. Gock, director in the Bank of America N. T. & S. A. were given awards in the supply category. A. F. Garlinghouse worked on highway construction as a resident engineer for the California State Highway Commission before he and his brother started their own firm and began developing construction machinery. Gock has concentrated on financing work and on supervising loans for construction for much of his banking career.

Lt. Gen. Samuel D. Sturgis, Jr., chief of the U. S. Army Corps of Engineers and Robert B. Diemer, general manager and chief engineer of the Metropolitan Water District of Southern California, came in for special awards for their work in the western section of the country. A third special award was made posthumously to William A. Johnson, former head of the American Pipe & Construction Co. and one of the founders and the first president of the Beavers. THE END

BIG Southwest Compaction Equipment for all types of tractors



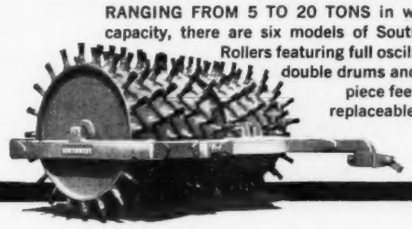
BIG Southwest Compaction Rollers



BIGNESS MEANS SPEED when earthmoving and compaction is the problem. These big, multiple-box rollers are made in five sizes ranging in weight capacity from 10 to 100 tons. **Single Box Compaction Rollers** are also available in two sizes with weight capacities up to 100 tons.

BIG Sheepsfoot Rollers

RANGING FROM 5 TO 20 TONS in weight capacity, there are six models of Southwest Rollers featuring full oscillating double drums and two-piece feet with replaceable tips.



BIG Southwest Rippers

IT'S A GIANT that weighs 25,000 lbs. Is built to penetrate to depths of 36", 42" or 48". Special center standard can be furnished to go 60" deep.

BIG Southwest Sprinkler Tanks

5000 TO 7500 GALLONS is the capacity of these big semi-trailer type Sprinkler Tanks. Have front, rear and under-tank spray bars. Get the facts about these big units; write for bulletins today!

Southwest Welding & MANUFACTURING CO.
CONSTRUCTION MACHINERY DIVISION
ALHAMBRA, CALIFORNIA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 210

Expressway job is speeded by fast, heaped scrapers

The sandstone material making up a large portion of the excavation is loosened and ripped by a LeTourneau-Westinghouse K-30 ripper pulled by a Cat D8. Two tractors worked with the ripper over hard ledges.

Push-loaded by a LeTourneau-Westinghouse Twin-C pusher, a spread of B Tournapull and Euclid S-18 scrapers loaded and hauled more than 875,000 cubic yards of excavation on the grading of a section of the Oklahoma City East Bypass. Grading and surfacing were done by W. E. Logan & Sons, Inc., Muskogee, Okla.

This new and modern expressway will carry highways U.S. 66 and 77 around the east edge of the city.

Near one end of this particular 3.375-mile project, the expressway is depressed to get under the intersecting streets. Near the opposite end of the job, it rises above natural ground to overpass a railroad track. This resulted in a combination of cut and fill which utilized all of the excavation within the limits of the job and even required more than 100,000 cubic yards of borrow. But, as a result, there were long hauls and more than 1.25 million station-yards of overhaul over the 500-foot freehaul distance. After grading had started, six separate contracts were let for the two combination bridge and overpass structures and fourteen highway-separations for this project. The project begins at the north bypass route leading to the Oklahoma City terminus of the Turner Turnpike and terminates a short distance south of 23rd Street which forms highways U. S. 62 and 270. The typical section of the completed expressway in this area will provide two 24-foot paved main roadways separated by a wide elevated grass median. Ten-foot-wide paved shoulders will be placed on the outside of the 24-foot pavements. There will be two 32-foot-wide service roads with curbs.

Roadways are bituminous

The main roadways are made up of a 5-inch asphaltic-concrete pavement on 8 inches of base and 6 inches of subbase. The service roads, which are curbed on both sides, have a 2-inch asphaltic-concrete surface on 8 inches of base and 6 inches of subbase. Both roadways slope at a 1.5-per cent grade from the median toward the outside. In addition to the 3.375 miles of this type of expressway, the project included several interchange ramps.

Clearing was the first operation when the job began early in 1956. An International TD-24 tractor-dozer knocked down most of the trees and pushed them into piles on the right-of-way where they were burned. The

GENERAL NYGEN® TIRES

...built tougher for the toughest jobs!

Featuring Stronger-than-Steel NYGEN® CORD

Designed to make every off-the-road job show a profit, big, rugged General Truck Tires are built to take brutal punishment . . . built to out-perform any other tire on any project. Unexcelled for strength with *exclusive* Nygen Cord construction and delivering dependable tractor-like flotation and traction, Generals provide the ultimate in job-hazard protection. Their job performance records prove Generals best!

specify GENERALS on your new equipment

THE GENERAL TIRE & RUBBER CO. • Akron, Ohio

For more facts, use Reader-Reply Card opposite page 18 and circle No. 211

The scarified material is loaded by a Euclid S-18 scraper with assistance from a LeTourneau-Westinghouse Twin C pusher. This big cut was made to depress the expressway below intersecting streets.

A LeTourneau-Westinghouse Model B scraper spreads a thin layer of fill material. The cut and fill work required all the 875,000-yard excavation within the job limits, plus more than 100,000 yards of borrow.

sod and thin layer of topsoil were stripped from both cut and fill areas before the scrapers went into action. The base of the fills was bladed by a Caterpillar No. 12 motor grader and then rolled with a heavy sheepsfoot roller and a 50-ton pneumatic compactor to be sure that all soft areas were thoroughly compacted.

A large portion of the excavation consisted of sandstone which ranged from relatively soft to very hard layers. Most of this material had to be ripped before it could be loaded, and one Caterpillar D8 tractor-dozer with a LeTourneau-Westinghouse K-30 ripper kept busy on this ripping operation. When the hard ledges were encountered, it was sometimes necessary to add another D8 to keep the ripper moving. Once the material was broken up, it pulverized well, making a very dense fill.

Use Twin C pusher

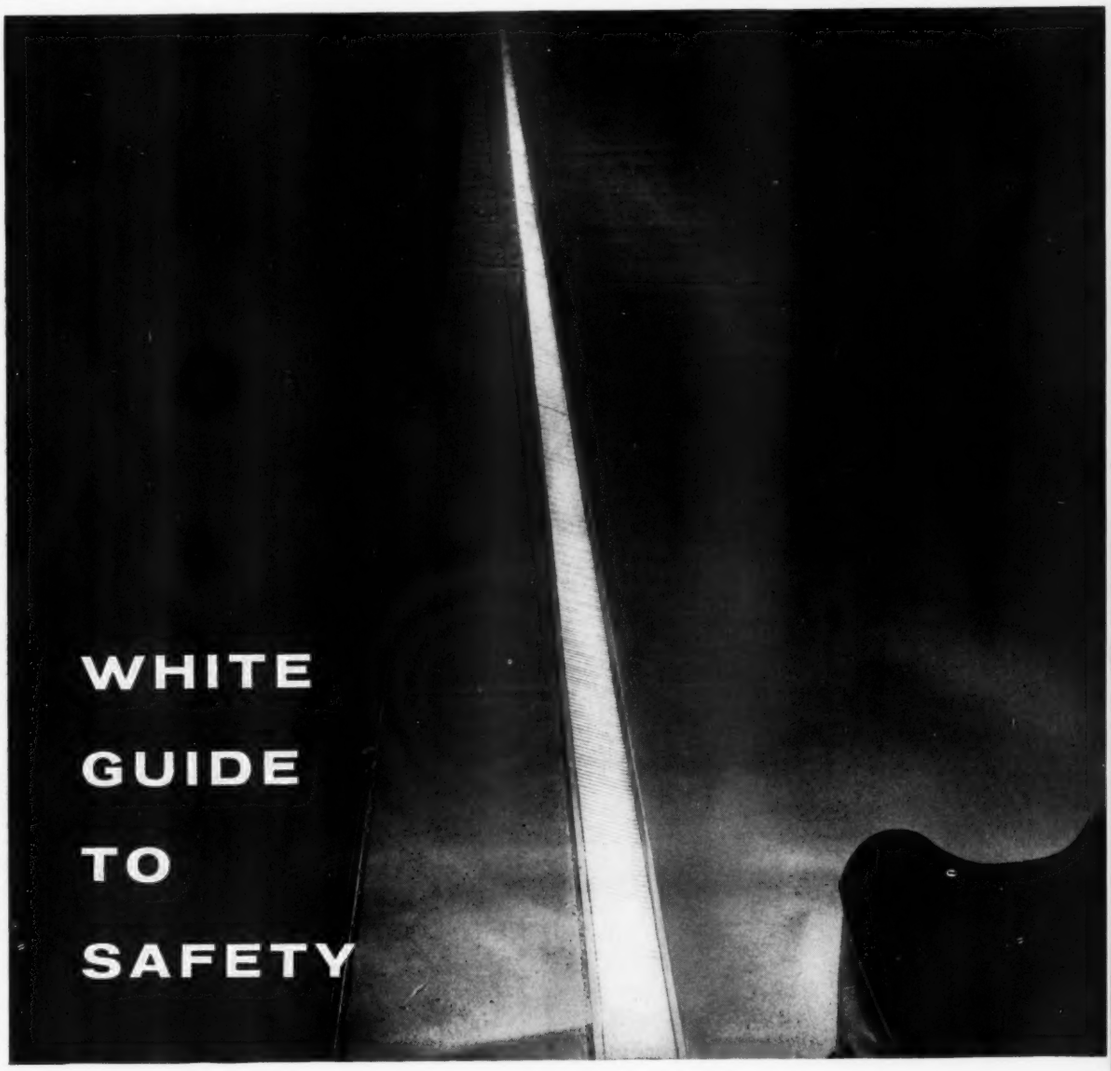
A spread of five scrapers handled a major part of the earthwork. Included in the spread were three Euclid S-18's, one smaller Euclid with a four-wheel tractor, and one B Tournapull. At one time there were four of the B Tournapulls on the job, but three of these were moved to other operations.

The basic pusher on all of the loading operations was one of the LeTourneau-Westinghouse Twin C tractors. This powerful rubber-tire tractor handled a great deal of the pushing work by itself. However, the contractor found that larger and heavier loads could be put on the scrapers in less time by using the Twin C and an International TD-24 crawler tractor in tandem.

With this combination, heaping, well compacted loads which averaged 20.5 pay yards were loaded in 45 seconds or less. With hauls ranging upward of a mile for a large part of the material, a round trip for the scrapers took from 10 to 14 minutes. With only four or five round trips per hour, it is obvious that the extra yardage in each load really paid off. Even with these hauls of more than a mile each way, the five scrapers were able to move from 5,000 to 6,000 cubic yards per 10-hour day on good days.

On the fill, the scrapers spread their loads as they dumped at high speeds. The material was shaped into 6 to 8-inch courses by an International TD-24 tractor-dozer and a Caterpillar No. 12 motor grader. Water was added by two Ford water trucks

(*Concluded on page 19*)



. . . concrete reflecting curb made with Atlas® White Cement

Night driving is safer with this glistening strip of white concrete stretching ahead. Drivers can see every curve and slope far ahead of them, in ample time.

For day driving, white concrete curbs stand out in contrast to darker paving. At night, the curb's saw-tooth surfaces reflect headlight rays back to the driver. And on rainy nights, when the need for visibility is greatest, the wet curb surface becomes even more reflective.

White concrete reflecting curbs made of Atlas White Portland Cement are the choice of more and more highway designers and builders. No highway of today or tomorrow should be without them.

Write for further information on how Atlas White Cements are contributing to highway safety:
Universal Atlas, 100 Park Avenue, New York 17, N. Y.

CB-54

UNIVERSAL ATLAS CEMENTS

USS

UNIVERSAL ATLAS CEMENT COMPANY—member of the industrial family that serves the nation—UNITED STATES STEEL

OFFICES: *Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco*

For more facts, use Reader-Reply Card opposite page 18 and circle No. 212

Fast-Acting Bladework

HUBER
W
WARCO

5D-190 MOTOR GRADER

The Huber-Warco 5D-190 offers fast-acting bladework, with no clutchwork. The combination of a 195 h.p. diesel engine, torque converter, power-shift transmission and tail-shaft governor, team up to enable the operator to make faster passes and smoother cuts. See your nearest Huber-Warco distributor for details.

HUBER-WARCO COMPANY
Marion, Ohio

For more facts, use Reader-Reply Card opposite page 18 and circle No. 213

As a Euclid S-18 scraper spreads material on the fill, a Gebhard double-drum sheepsfoot roller, pulled by an International TD-18 starts the compaction job.

This Insley backhoe works in tight quarters as it excavates a pipe trench under an intersecting pipeline during drainage operations. This work was done by Atlas Development Co., Tulsa, Okla.

(*Continued from page 19*)

carrying 1,200 and 1,500-gallon tanks to obtain optimum moisture for the compaction. Water was pumped from a nearby pond by a Jaeger pump.

Each layer of the fill was thoroughly compacted by a Gebhard double-drum sheepfoot roller pulled by an International TD-18 tractor-dozer and by the heavy machinery operating over the fill. When four of these 6-inch courses had been placed and compacted, the 2-foot lift was rolled with a Bros 50-ton pneumatic compactor pulled by a LaPlant-Choate 2-wheel tractor. A minimum of 95 per cent density was obtained.

Lubrication of the grading spread was handled by a two-man crew using a lube truck fitted with Alemite equipment. Servicing was done during the day, one rig at a time.

Drainage

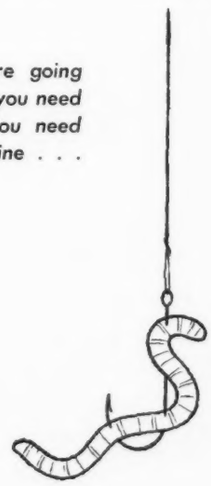
The drainage work, handled by Atlas Development Co., Tulsa, Okla., included a substantial amount of work. In addition to two large box culverts which were built by the general contractor, there were 17,606 linear feet of concrete pipe culverts and storm drains in sizes ranging from 18 to 42 inches. Atlas also installed 2,000 linear feet of 6-inch corrugated metal perforated underdrain pipe.

To dig the trenches and install this pipe, Atlas used two Insley backhoes. Since much of the pipe was in the median or the ditches, there was not too much interference with the grading and surfacing operations. A Caterpillar D6 tractor-dozer did most of the backfilling of the pipe trenches.

Ross Logan, one of the partners of W. E. Logan & Sons Co., was on this job during most of the construction operations serving as job superintendent. T. E. Bell was grading foreman. The drainage work by Atlas Development Co. was supervised by superintendent Bill Wilkerson. Atlee Cannon was foreman.

Representing the Oklahoma State Highway Department were resident engineer J. M. Copeland, assistant resident engineer R. J. Williams, and inspectors Roy West, Joe Pennington, and J. L. Grubb. The work was done under supervision of the Perry Division of which C. O. Brewster was division engineer. Construction engineer for the department is J. J. Stobaugh, Jr. THE END

CONTRACTORS! *When you're going after new construction business, you need more than the right bait — You need to know where to drop your line . . .*



We help you pick the right pond

just looking anywhere is a costly way to find business—the best, economical way is to be at the right place at the right time. If you want to know what jobs are coming up and when, then mail this coupon today.

TO: **DODGE REPORTS**, 119 WEST 40th STREET, DEPT. 70 NEW YORK 18, N. Y.

Yes! I'd like to pin-point my prospects by knowing in advance who's going to build, what, when, where.

I want to know whom to contact and when to submit bids.

I'd like to see some Dodge Reports and I'd like a copy of your booklet that tells how to use this accurate, daily, up-to-the-minute construction news service.

I understand that I can pick just the area and type of construction activity that interests me. Also, that I won't have to wade through mounds of data to find the information I need.

I'm interested in General Building ☐ House Construction ☐ Engineering (Heavy Construction) ☐

in the Following Area: _____

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Dodge Reports
For Timed Selling to the Construction Industry

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 214

Adjustable hangers have been added to the Essick Model VR-28-W so that it may be hauled on the tailgate of any dump truck.

Roller now can be hauled on dump truck's tailgate

■ The mobile Essick Model VR-28-W vibrating roller is now equipped with adjustable carrying hangers that make it possible for the roller to be hauled on the tailgate of any dump truck, according to the manufacturer.

The self-propelled hand-guided roller is specifically designed for road maintenance and patch work. It is said to be as effective as a 5-ton static roller on asphaltic material and as effective as a 16-ton roller on subbase. The rig weighs 800 pounds.

For further information write to the Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif., or use the Request Card at page 18. Circle No. 100.

Transit mixer spex sheet

■ A specification sheet on the new Rex 5½-cubic-yard Adjusta-Wate Moto-Mixer is available from the Construction Machinery Division of the Chain Belt Co. The specification sheet covers basic components of the mixer and six categories of accessories.

To obtain this specification sheet write to the Construction Machinery Division, Chain Belt Co., 4701 W. Greenfield Ave., Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 92.

Report completed on highway deaths

All "known and tested" safety devices were recommended as standard equipment on "all model cars" by the report of the subcommittee of the House Interstate and Foreign Commerce Committee that recently completed an investigation of the traffic death toll.

Headed by Rep. Kenneth A. Roberts (D., Ala.), the subcommittee investigation revealed a number of factors that are aggravating the highway death problem.

Among them are the high speed and horsepower of the newest cars; failure of states and cities to coordinate traffic control; and the confusion caused by numerous traffic signs, regulations, and laws.

February 17–24 is Brotherhood Week. World peace starts at home!

Huge blast produces rock fill for railroad

A 909,000 pound explosion, the second largest non-atomic detonation in U. S. history, was set off last month by Southern Pacific Railroad in Little Valley on the east shore of Great Salt Lake. Rock blasted loose is being used for fill in construction of a track across the lake.

The largest non-atomic explosion in the United States—that of 1,362,000 pounds—was set off in Bristol, Tenn., in 1948 by the Tennessee Valley Authority.

Survey shows new methods in Chicago construction

Construction advances, which have made Chicago important as a center for building developments in the past, are continuing to be made in the city, according to a survey of the Building Construction Employers Association of Chicago, Inc.

Chicago contractors are continuing to pioneer in such developments as modular dimensioning, lightweight construction, curtain walls, and prestressed concrete. Improvements in building equipment and tools being used, the use of steel frame scaffolding for shoring, and wider use of prefabricated materials, and concrete placement in many forms—including the lift-slab method—are helping to make this city's contractors some of the more modern building firms in the country.

Conventions are listed on page 13.

It's the hard work that separates the "men" from the "boys" in construction equipment. Faced with their greatest construction challenge in history—the 41,000-mile Interstate Highway System—contractors must depend on "men" if they are to get the job done profitably, and get it done on time.

Any machine can do a passable job when the going is easy. But this challenge involves *hard* work . . . the kind that tests the ability of equipment to produce. That's the kind of work that made Caterpillar built machines the leading equipment used by contractors. CAT* units are designed and built for money-making performance under the toughest conditions. Where the going is roughest, Caterpillar

distributor doings

Interstate Tractor expands sales staff

Four sales representatives have been added to the staff of Interstate Tractor & Equipment Co., the new Oregon distributor for Thew-Lorain shovels, Euclid earthmovers, and Chicago-Pneumatic air compressors and equipment. All four men will work from the Portland store at 2855 N.W. Front Ave. The firm also has offices at 1041 Highway 99 N.

Representing the Euclid Division of General Motors Corp. line of road-building machines will be Ray Kizer. William J. Mitchell of Eugene will be special representative for the Lorain line, while Ted Henry will head the new air-equipment sales and rental division as a special Chicago-Pneumatic Tool Co. representative. Robert C. Rose will become territory manager and assist in machine installations for Interstate.

New Childers dealer

A new Minnesota distributor for the Childers Mfg. Co. Albuquerque, N. Mex., is Olson Equipment Co., 4411 Hiawatha Ave., Minneapolis.

The dealer, which will serve the entire state, will handle the entire Childers line of circulating hot oil heaters.

Canadian outlet for Euclid earthmovers

Blackwood Hodge Equipment Ltd., formerly Innes Equipment Ltd., is the new dealer for the complete line of Euclid earthmoving equipment in the Province of Ontario, Canada.

H. G. Clappison, executive vice president, is in charge of Canadian operations at 10 Suntract Road, Toronto. A branch in Port Arthur will serve northwestern Ontario.

The dealer is the Canadian division of Blackwood Hodge, Ltd., London, England, one of the world's largest equipment distributors.

Distributor consolidates

W. H. Anderson Co., Inc., of Detroit, Mich., has consolidated its sales department and its rental and service departments. These departments, previously situated in different parts of Detroit, now operate from the same location.

Anderson represents such manufacturers as the American Tractor Corp., Jackson Vibrators, Inc., and Whiteman concrete equipment.

District office opened

Garlinghouse, Fremon & Co., Los Angeles, Calif., has opened an office in San Diego, Calif., to be managed by Ed Myers. The office will serve San Diego and Imperial Counties.

Among the lines carried by Garlinghouse are those put out by Construction Machinery Co., Engineered Equipment, Hewitt-Robins, and McKiernan-Terry.

Training center built

The Galion Iron Works & Mfg. Co., of Galion, Ohio, has completed a new Sales and Service Training Center building to house its distributor personnel training program. The building has an auditorium, class rooms equipped with cut-away grader and roller parts, offices, and a display room for Galion products. W. R. Troyer is in charge of the training program.

Concrete Transport appoints six dealers

Concrete Transport Mixer Co., St. Louis, Mo., has appointed six new distributors for merchandising the company's Rocket Mixer.

The Arizona territory will be covered by Jost Concrete Products Co., Prescott, Ariz., and Superior Coach Sales & Service, of Phoenix; the state of Virginia by McIlhany Equipment Co., Inc., of Roanoke and Richmond, Va.; the northern half of Georgia by Stith Equipment Co., of Atlanta, Ga.; the state of Louisiana by Jackson Machinery Co., New Orleans, La.; and the eastern half of Michigan by the Acme Equipment Co., of Detroit.

Dealers: Distributor Doings, your department in Contractors and Engineers, is devoted to the activities of construction machinery firms handling sales. Send any news of your firm directly to the Editor.

...ipment gets and handles the job. Got some hard ...rk to be done? Give it to the machines that want ...like it and can do it profitably for you—Caterpillar-...lt machines!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

...EL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

HEAVY-DUTY MACHINES FOR THE HARD WORK

For more facts, use Reader-Reply Card opposite page 18 and circle No. 215

A truckload of asphaltic concrete moves out to the highway from the Standard hot-mix plant. Two changes—in burner equipment and in the asphalt valve at the hop pot—speeded the batching cycle.

Lane, curbs built together for 4-lane tourist route

One of the principal features of the 4.5-mile section of U. S. 64 near Santa Fe, N. Mex., is a raised drainage curb, built monolithically with the plant-mix surfacing.

Though this portion of the $700,000 job might have posed a problem for some contractors, it gave no difficulty to Brown Contracting Co., Albuquerque, which had used a special shoe on a Barber-Greene paver for the same type of construction several years ago.

As part of the job, which was financed jointly by the New Mexico State Highway Commission and the U. S. Government through federal aid, Brown handled grading, drainage, production and installation of subbase, and plant-mix paving that consisted of two 1½-inch courses. Altogether, the job called for 441,000 cubic yards of unclassified grading, 33,000 tons of asphaltic-concrete paving, and about 100,000 tons of subbase material.

The heavily traveled tourist route between Santa Fe and Taos now has a 72-foot roadway with two 24-foot traffic lanes. These are separated by a 6-foot raised dividing median covered with a chip coat in a color providing contrast to that of the traffic lanes. Each pavement lane also has 8-foot shoulders paved with asphaltic concrete. In sections where the highway had to be constructed on high fills, engineers provided for 6-inch raised asphaltic-concrete curbs to catch and train water down to built-in sumps. These, and corrugated metal pipe of various diameters, carry water below the toe of each fill. This solves the erosion problem in this area, where very few highway slopes grow an adequate ground cover quickly.

H. C. Roane (left), Gulf's Atlanta Assistant District Manager; N. J. Harmon (center), Gulf Sales Representative; M. C. Akin (right), MacDougald Construction Company Superintendent meet on the job site to discuss how Gulf can best service the MacDougald equipment.

Theodore Brown, president of Brown Contracting Co., and project manager on this job, looks over one of the special concrete curbs and drain inlets included in the contract.

GULF PRODUCTS and FINE SERVICE

keep equipment rolling on Georgia State Farmers Market

One and a half million cubic yards of dirt will be moved in grading, excavating and drainage for the new State of Georgia Farmers Market near Atlanta. MacDougald Construction Company of Atlanta has the contract for this million-dollar project.

The job is scheduled to be completed in 100 working days, so MacDougald Construction Company is using Gulf petroleum products exclusively. They know that Gulf quality lubricants protect against mechanical delays, while Gulf fuels insure top engine performance. And they know they can always rely on Gulf to make prompt deliveries.

Fifteen hundred Gulf warehouses are ready to serve you, too, and Gulf petroleum engineering counsel is yours for the asking. For more information, call your nearest Gulf office or send the coupon for a copy of "Gulf and *Your* Business."

GULF

C&E

Gulf Oil Corporation
1822 Gulf Building, Pittsburgh 30, Pennsylvania

Without any obligation on my part, send me a copy of the booklet "Gulf and Your Business."

Name_____

Street Address_____

City_____ Zone_____ State_____

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 216

Two pavers work simultaneously, eliminating cold joints; 33,000 tons of hot-mix turned out at rate of 1,060 tons daily

This Grace power broom is pulled by a pickup as it sweeps the primed base before asphaltic-concrete paving is done. The same rig also swept the hot-mix courses whenever necessary.

Grade built early

The grade was built with a fleet of Caterpillar No. 80 scrapers towed by Allis-Chalmers HD-20 tractors, and Euclid scrapers towed by four-wheel rubber-tire prime movers. All had Allis-Chalmers HD-21's as pushers, the number of units used depending on the amount of work being done at any one time. About 100,000 gallons of water were used daily during parts of the grading operation, and both sheepsfoot and pneumatic rollers developed approximately 90 to 95 per cent of Modified AASHO density. The granular base on this subgrade averages about eight inches thick and consists of 1½-inch-minus material produced from a single location by Brown's Cedarapids Master Tandem rock plant. The same plant setup also produced mineral aggregates for the hot-mix, and these were stored in one pile over a steel feeder tunnel equipped with adjustable slide gates that fed the material to the hot plant.

Single hot plant setup

One asphalt plant setup, approximately a third of the distance through the project, turned out the entire 33,000 tons of paving material. This plant consisted of a Standard series SM 4,000-pound unit with a single dryer, a dust collection system, screens, hot and cold elevators, and the usual plant components. Auxiliary equipment included a Childers C-100 circulating oil heater, a Caterpillar D385 diesel-electric generating set of 94-kw capacity, two tanks storing 24,000 gallons of asphalt, and storage for 12,000 gallons of bunker No. 6 heavy fuel oil that was used in the Hopkins bank of dryer burners.

Though the 30-second minimum mixing time in the pugmill was exceeded by eight seconds, it was compensated for by two basic plant changes. First, the burner equipment in the dryer was changed to a Hopkins four-unit burner with its own blower. This created a low pressure fire for efficient drying. Second, a changeover was made at the asphalt valve at the hot pot so that asphalt for each batch could be dumped in only seven seconds. This lowered the time for each batch cycle. In running 120,000 tons of hot-mix with this plant, an average of 1,060 tons of material were turned out per nine-hour working day.

The 85 to 100-penetration bitumen used in the mix was delivered from the Malco refinery in Artesia, New

(Continued on next page)

For more facts, circle No. 217→

BUCYRUS ERIE

Your kind of machine...

the new 30-B

MODERN, PROVED DESIGN

The 30-B offers you proved, advanced design features that have made Bucyrus-Erie crane-excavators outstanding performers on all types of work.

Parts are simple, generous in size, few in number — with plenty of strength for dependable service without unnecessary weight to reduce working efficiency.

Air controls are easy to operate, conveniently placed, accurate. Hoist, crowd or drag, swing or propel, and steering clutches, as well as digging and swing brakes and dipper trip are air controlled.

Loads are distributed properly between upper and lower works by six conical hook rollers — two equalized pairs in front and two singles in rear. Precise machining, heat treating and flame hardening provide smooth rotation and long life.

Special greasing system, with remote control located at operator's position, for greasing swing pinion and rack; grease fittings grouped to save time.

TAILORED TO YOUR NEEDS

Choice of crawler mountings — five different sizes of crawlers and treads to fit requirements. Also, Transit Crane on rubber-tired carrier.

Power and drive options — crawler-mounted 30-B offered with gasoline, diesel (direct or torque converter drive) or single motor electric power.

Transit Crane — gasoline or diesel, 35-ton capacity.

Five front ends — both crawler machine and Transit Crane fully convertible to shovel, dragline, clamshell, crane, dragshovel.

Extra equipment for special jobs — includes various-length crane booms and jib extensions, independent propel, third drum unit, cathead, power controlled lowering on main hoist line.

Let your Bucyrus-Erie distributor give you all the facts on the all-new 30-B, show you why it is the *right* machine for your job. See him soon — or write for complete details. 318E57C

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

A smooth straight roadway, in what was formerly rough terrain, takes shape under one of the two Barber-Greene finishers working on the 1½-inch base course.

A Tampo rubber-tire unit, pulled by an Oliver rubber-tire tractor, compacts a lane as soon as the knockdown roll has been applied. Finish rolling follows.

(*Continued from preceding page*)

Mexico, in insulated trucks. Loaded at the refinery at a temperature of about 300 degrees, the material reached the job site at a temperature of about 270 degrees—a temperature high enough so that the material could still be pumped. A Viking 4-inch asphalt pump at the storage tanks assisted in unloading the trucks. A Viking full-circulating pump kept hot asphalt flowing between the storage tanks and the hot pot.

Both asphalt and rock aggregates were heated to a temperature of 285 degrees in the plant, permitting hot-mix to be dumped to the highway at a temperature of approximately 275 degrees. The asphalt heated by a circulating hot-oil system was given a boost by the Childers C-100 heater. The burners in this machine used diesel fuel to generate heat, and Regal heating oil was used in the circulating coils to maintain temperatures in the asphalt tanks. Fines that tended to escape through the stack were recovered by the plant's dust collection system, which returned the material to the foot of the hot elevator. Raw aggregate entered the dryer over a 24-inch conveyor run that extended from beneath the gates in the middle tunnel to a discharge point at the foot of the bucket chain making up the cold elevator.

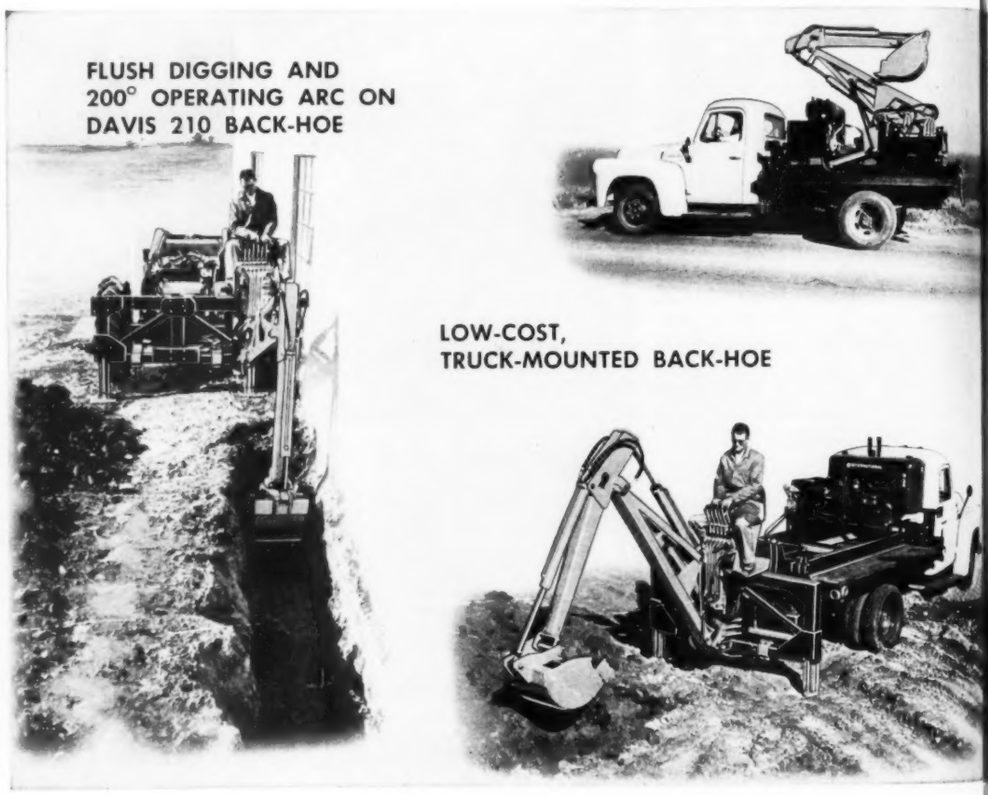
The plant-mix paving for both base and surface courses had the same gradation:

Size sieve	Per cent passing
½-inch	88–95
⅜-inch	73–83
No. 4	54–64
No. 10	38–46
No. 40	17–25
No. 80	9–15
No. 200	4.5–8.5
85–100 penetration asphalt	5.6 per cent

Two laydown machines

Two Barber-Greene finishers were used simultaneously to eliminate cold joints during paving operations. Joints formed at the end of a day's run were sawed square with a concrete saw. One paver worked several hundred feet, then dropped back to start on a third lane while the other paver laid the second lane.

In sections where the 6-inch-high



DISCOVER DAVIS

THE EQUIPMENT THAT LEADS THE WAY

drainage curb had to be constructed at the edge of the pavement, a special trapezoidal-shaped shoe of steel was fastened to the side of the finisher frame. This attachment constructed the curb as the machine moved along. This shoe can be quickly disengaged by loosening several bolts. In sections where a tapered edge was required, a taper shoe was attached to the finisher. This attachment used the same bolt holes as the curb form attachment.

As the pavers, working 12-foot lanes, built up the 72-foot mat, a combination of pneumatic and steel-wheel compaction was used on the courses. The initial knockdown roll and the rolling of the longitudinal strip joints were done by a Galion tandem 6 to 8-ton steel-wheel machine that operated close behind the paver. An Oliver rubber-tire-drawn set of Tampo pneumatic rollers operated between the knockdown and finish rolls. Finish rolling was done by a Galion 10 to 12-ton tandem machine that worked behind the pneumatic rig. A Grace power broom swept dust off the primed subbase and, if necessary, swept the first course of asphaltic paving.

Personnel

The contractor's field operations were under the personal supervision of Marvin Johnson. Theodore Brown, president of Brown Contracting Co., acted as project manager. Ray Chaves was foreman of the asphalt plant.

The New Mexico State Highway Commission's engineering force is headed by L. D. Wilson, chief highway engineer. Work on this project was supervised from the Santa Fe District Office of the New Mexico State Highway Commission. John J. Fairly is district engineer; C. D. Richman was the resident engineer for the project. THE END

Rough usage will not affect measuring tape's accuracy

■ A new measuring tape that reportedly will retain its accuracy despite rough usage and abuse is announced by The Lufkin Rule Co. The Hi-Line rule is woven from synthetic fibers that are said to be long wearing and dimensionally stable.

The ⅜-inch-wide tape is a nonconductor of electricity. It has red and

black markings on a white background. The tape is furnished in either a leather case with a rust-resistant metal liner, or in a perforated disk-type nickel-plated reel. The Hi-Line is available in lengths of from 25 to 150 feet.

For further information write to The Lufkin Rule Co., Saginaw, Mich., or use the Request Card at page 18. Circle No. 88.

Electric chain saw cuts 32-inch lumber

■ A new 18-pound electric chain saw that will cut lumber or timber piling up to 32 inches in thickness is announced by the Porter-Cable Machine Co. The Model 156 has a 12-amp motor that delivers approximately 2 horsepower, and operates on house current or the equivalent.

Power from the motor is transmitted through oversized worm gears. The cutter bar is offset from the aluminum-alloy motor housing to permit cutting within one inch of the ground. The blades meet the motor housing at an angle, giving the operator greater leverage and keeping the cutting chain out of the dirt when the saw is placed on the ground.

Gripping teeth on both sides of the cutter bar eliminate the possibility of the saw leaving the cut. Power is controlled through a positive-action trigger switch. A built-in oiler provides push-button lubrication even while the chain is in motion. The chain operates at 1,750 fpm.

For further information write to the Porter-Cable Machine Co., 87 Exchange St., Syracuse 8, New York, or use the Request Card at page 18. Circle No. 108.

Galion representatives

Two district representatives for the Galion Iron Works & Mfg. Co., Galion, Ohio, have new territories.

Rex F. Price is handling Iowa, Wisconsin, and North and South Dakota, and continues to retain Oklahoma, Nebraska, Kansas, Missouri, and part of Illinois. His office is at 6109 W. 61st Terrace, Mission, Kans. Porter Little, located at 415 W. 13th St., Texarkana, Texas, now covers Tennessee, Alabama, Georgia, Mississippi, and Arkansas, as well as Texas and Louisiana.

New Back-Hoes and Loaders for 1957

...make More Profits for You!

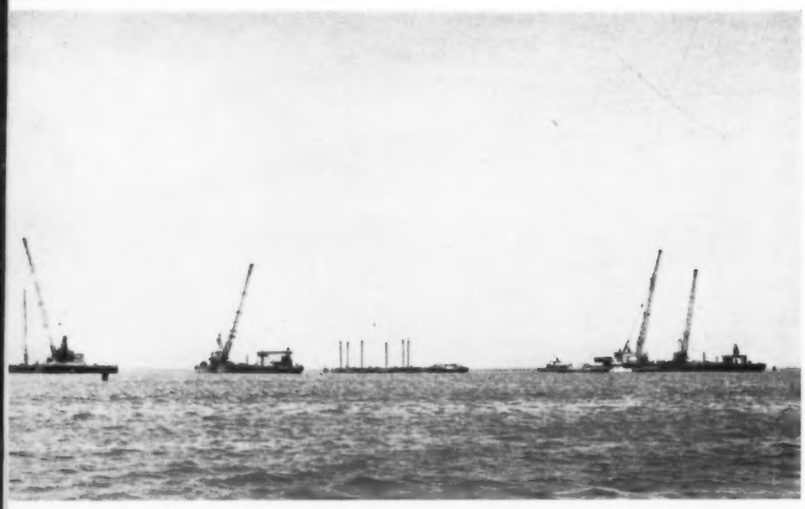
Here's good news for back-hoe and loader users. Davis opens a whole new era of profits. ***The New 210 Davis Back-hoe*** has three interchangeable mounting points so you can switch digging positions from center to side for flush digging alongside buildings, fences, etc.... and an engineering achievement desired by all — but accomplished only by Davis — an exclusive ***hydraulic rotary boom swing cylinder*** that gives smooth, continuous ***200° cushioned operating arc*** without ever changing a pin. Both the new 210 and the popular 185 have 7,000 pounds of breakaway power and an adjustable seat with extended foot rests.

Both models are now available as low-cost, ***truck-mounted units*** for any one-ton or larger flat-bed truck — self-powered, completely detachable, or attached in matter of minutes, and designed to fold into a compact package for easy transporting with everything being accomplished hydraulically. ***The Davis Loader***, already the possessor of more "firsts" than any other make, has also been improved for even better workability. For better profits in 1957... for better equipment in earth moving and material handling, see **DAVIS**, America's premium equipment that sells for competitive prices.

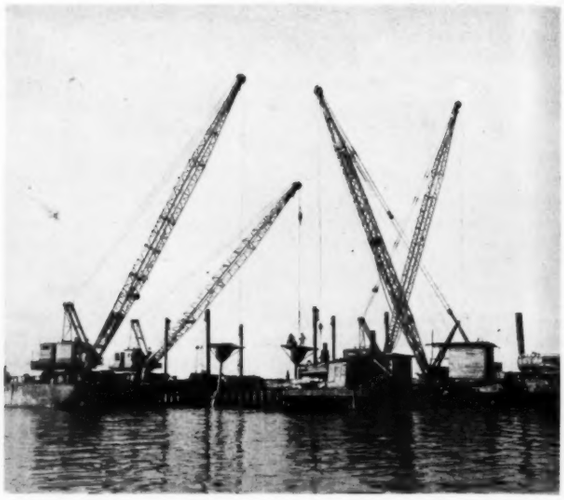
Available for Most Popular Tractors
Davis Products are sold and serviced anywhere in the United States.
Write for your dealer's name, please specify make of tractor and equipment desired.

MID-WESTERN INDUSTRIES, INC.
1009 S. WEST ST., DEPT. B, WICHITA, KANSAS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 218



Three Bucyrus-Erie 54-B's and a Wiley Whirley work from barges to build different piers for the girder span section of the Galveston-Pelican Island Causeway. At this point, the facility will span the channel.



The four barge-mounted cranes cluster around the cofferdam for the biggest concrete pour on the job—the 2,400-yard tremie seal for the south bascule pier.

Land, floating rigs team for mile-long causeway job

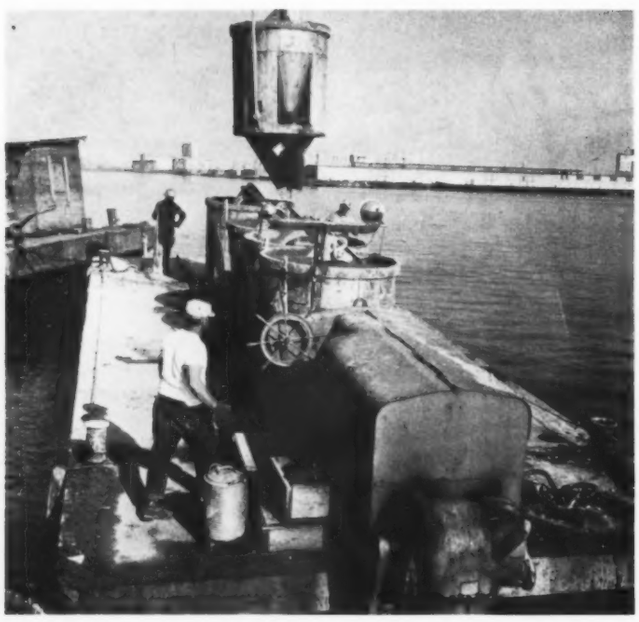
Bridge, trestle, and hydraulic fill sections built for 6,195-foot Galveston-Pelican Island causeway

by RALPH MONSON, field editor

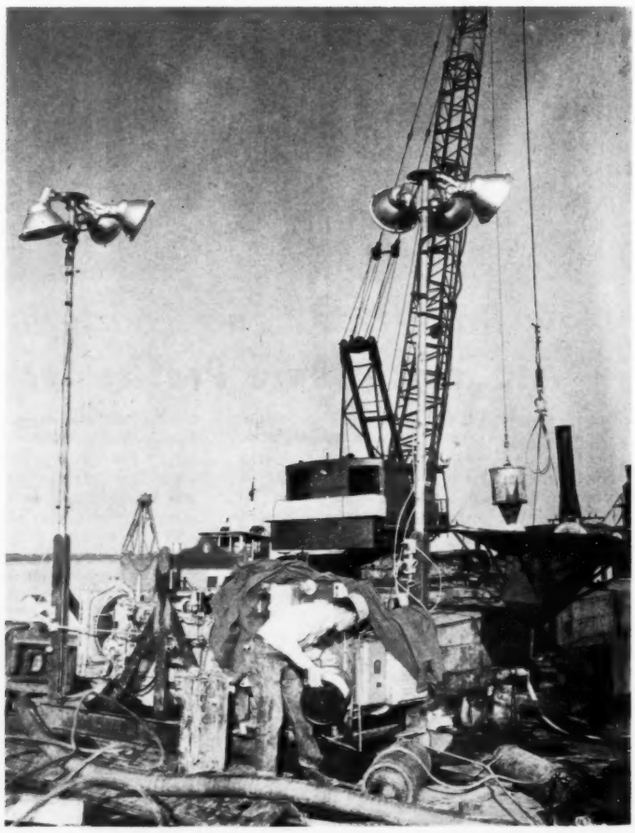
A combination of work on pile trestles, hydraulic fills, and substructures for bridge spans made up the initial phase of the $6 million causeway that will run across more than a mile of Galveston Bay and provide rail and highway connections between Galveston, Texas, and nearby Pelican Island.

Pelican Island, the large, low-lying island north of Galveston that is separated from the city by a relatively narrow channel, has docks and shipping facilities along the protected waterway that make Galveston the seaport that it is. But there has been little development on the island itself, except for a shipyard that operates its own ferry service.

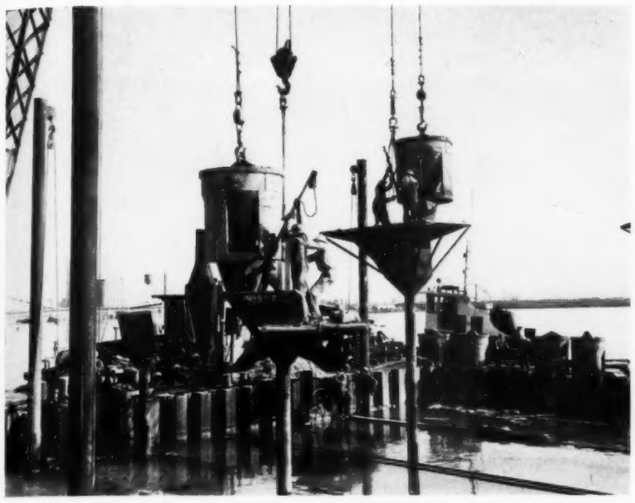
A special governmental agency—the Galveston County Navigation District No. 1—was set up to construct and operate the causeway and related facilities, which are being financed by the city of Galveston through a $6 million bond issue. When the causeway is completed this summer, the Pelican Island Development Corp., a private agency, will put plans for the industrial and residential development of the new land into operation, and revenue from this development is expected to repay the bond issue.



A full bucket is lifted off this barge—one of three powered by a Murray & Tregurtha diesel outboard propulsion unit that operates like a huge outboard motor. These barges were also used to move material to the piers.



A Caterpillar D315 generator set, supplying power to six flood lights set up on barges around the cofferdam, is serviced. These lights were pressed into use for one night and part of a second during the 36-hour tremie pour.



Men on platforms attached to the tremies open the buckets. This is tricky work, because the bucket rises as it discharges its load, while the tremie tends to sink under the weight of the concrete.

Ready-mix concrete for the 12-foot-thick tremie seal is discharged to 2-yard buckets from a Smith 5-yard mixer on a Mack B-42 truck. Five Gar-Bro 2-yard buckets, taking two truckloads of concrete, are carried on this barge.

Carries highway and railroad

Plans for this causeway were prepared by the engineering firm of Parsons, Brinckerhoff, Hall & Macdonald of New York, N. Y., and Houston, Texas. Farnsworth & Chambers Co., Inc., Houston, took the $2,915,000 substructure contract, and Kansas City Bridge Co., Kansas City, Mo., has the $1,598,380 contract for furnishing and erecting the steel superstructure of the bridge spans.

Since the causeway will carry a single-track railroad and a paved roadway side by side, its cross section is unusual. The 17-foot deck section for the ballasted railroad track will be separated from the 26-foot paved roadway by a narrow island. On the opposite side of the roadway will be a raised curb and a 5-foot sidewalk.

Of the 6,195-foot length of the causeway, 2,970 feet is made up of hydraulic fill. Most of this is at the south or Galveston end. Of the 2,100 feet of concrete trestle, about half is on either side of the nine girder spans and single-leaf bascule span over the middle of the channel. The girder spans have a length of about 102 feet each, and the bascule span is 160 feet long.

Phase 1 of this project required a combination of land and marine operations. Though the work on water was not quite large enough to warrant a major marine setup, there were times—such as during the placement of the 2,400-cubic-yard tremie seal for the main bascule pier—when a big floating concrete plant would have been very convenient.

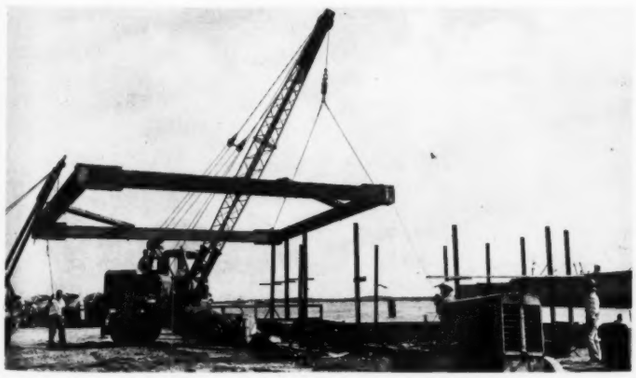
To meet this job situation, Farnsworth & Chambers used a combination of crawler and barge-mounted cranes, together with a large array of supporting equipment. Three Bucyrus-Erie 54-B crawler cranes mounted on 30 × 100-foot barges and a 25-ton barge-mounted Wiley Whirley were used for the construction of the pier footings. A Koehring 605 crawler alternated between doing marine operations from a barge and doing dry-land work. The long, heavy trestle piles and the precast deck sections were placed by a Clyde 35-ton barge-mounted derrick.

On all except the large bascule pier, the cranes worked individually or in pairs, and work progressed on several piers at the same time. Each of these piers consisted of two legs built in separate cofferdams and joined 12 feet above the water by a heavy cap.

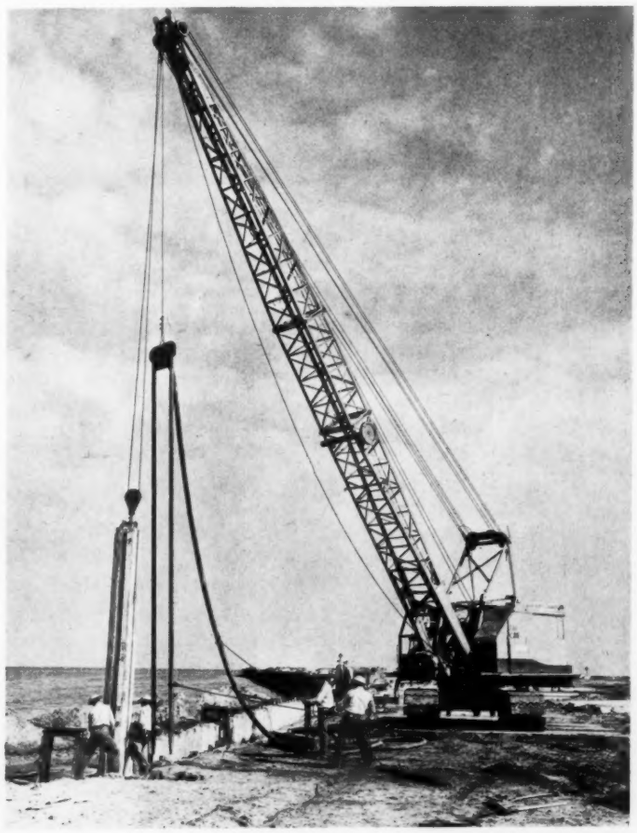
The steel and wood frames for the

(Continued on page 30)

The Wiley Whirley derrick, left, and a Bucyrus-Erie 54-B team together to set L. B. Foster sheet piles and cofferdam frames for a bridge pier cofferdam. The Harbormaster barge near the Wiley derrick is supplying fuel to the rigs.



A shore operation—assembly of a cofferdam frame—is handled by a Unit Model 352 motor crane and a boom truck. Cofferdam frames are assembled on barges and brought directly to the pier location.

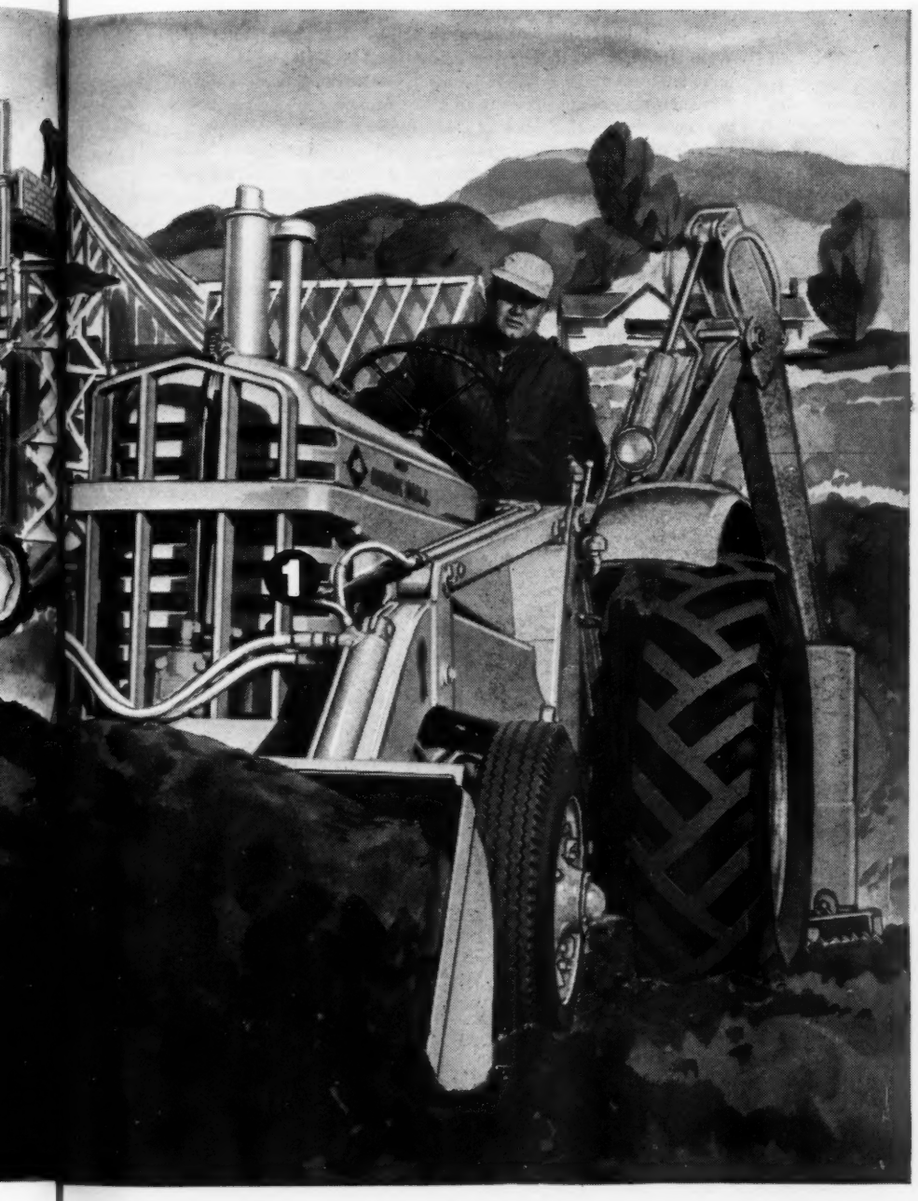


The toe of hydraulic fill that forms approaches to the causeway, is protected by a line of heavy concrete sheet piling. Here, a hole has been jetted and the Koehring 605 drops the piling into the hole to be jetted to grade.

Versatile Work Bulls

pay off

on every project !



Work Bulls provide the *right* tractor power with design-integrated attachments to build profit on these and scores of other jobs!

52 hp — 1. WORK BULL MODEL 404

is biggest, most powerful in line. Equipped with a hydraulically controlled ¾-yd. loader bucket.

42 hp — 2. DAVIS PIT BULL

with ⅞-yd. bucket. Utilizes low, direct-thrust loading principle. Torque converter and combination foot feed and reversing clutches are standard.

4000 lb — 3. FORK LIFT MODEL 202

utilizes 34-hp tractor, can lift 4000 lbs with standard 10-ft mast. Optional mast extension, shown, will lift up to 2000 lbs to height of 21 ft.

34 hp — 4. WORK BULL MODEL 202

equipped with 11 cu. ft. loader and fast, precisely controlled, hydraulic backhoe. Hoe handles 12 to 36 in. buckets . . . digs to depth of 12½ ft. Operator and hoe swing through 180°.

. . . as primary equipment

Work Bulls give both large and small contractors, municipalities and general industry a great new opportunity to put former hand labor, or work too small for their present equipment, on a paying power basis. With five tractors (34 to 52 hp) — each with a score of *switch-in-a-smoke-break* attachments — Work Bulls are truly a dozen machines in one. They pay off on small, scattered work-and-run assignments. And they'll earn their keep off-season, too. You can use them or lease them out for snow removal, or scores of money-making jobs.

. . . as backup machines

Ever worked a job too big for one machine but too small to be profitable with two? That's another type of assignment where Work Bulls pay off. Team Work Bulls with bigger, more expensive, single-purpose rigs. You get the exact power-equipment cost ratio the job demands. And you increase equipment scheduling efficiency. What's more, Work Bulls travel anywhere without expensive trailers or special travel permits. Thus, it's highly practical to shoot them from site to site as your production picture changes.

. . . as utility or cleanup tools

When you're using shovels to clean up spill in the loading area, scrapers to smooth out haulroads, crawler dozers to haul wagons or skid light and medium-weight machinery — there's a profitable place for Work Bulls on your job. Low in initial price, hourly cost and upkeep—Work Bulls provide a perfect means of making cleanup and utility jobs pay. With Work Bulls on the job, your mainline equipment can concentrate on the type of work it's designed for. Work Bulls supplement "big stuff"... easily, inexpensively.

Write today for 24-page catalog and name of your distributor

M·H·F WORK BULLS

Division of Massey-Harris-Ferguson, Inc.

12-B Quality Avenue **Racine, Wisconsin**

For more facts, use Reader-Reply Card opposite page 18 and circle No. 219

Bearing piles are driven inside one of the pier cofferdams by a McKiernan-Terry 10-B-3 hammer handled in a set of swinging leads by a B-E crane with 100-foot boom. This pier footing requires 36 of the 77-foot wood piles.

(*Continued from page 27*)

25-foot-square cofferdams were fabricated at the contractor's yard, located near a dock on the Galveston shore. A Unit 357 motor crane and an International winch truck helped assemble these frames on barges, and the barges carried the frames from the dock to the pier locations. At the pier sites, one of the cranes picked a frame off the barge and set it in place over a set of spuds that had been driven beforehand.

The cofferdam of M-116 sheet piling, rented from L. B. Foster Co., was driven around the frame by a McKiernan-Terry 9-B-3 hammer that was handled by one of the floating cranes.

Untreated pine and cypress piles, from 60 to 75 feet in length, were then driven to bearing in the bottom of the bay. A McKiernan-Terry 10-B-3 hammer handled this job, working in 85-foot swinging leads handled by one of the Bucyrus-Erie cranes with 100-foot boom. From 36 to 49 piles—some vertical and some battered—were driven in each of these piers. The piling was driven to the bottom of the pier excavations—as much as 40 feet below the surface. A spud-bar extension was used for the underwater driving.

Once the piling was in place, a 9-foot-deep tremie seal of concrete was placed before the cofferdam was unwatered. A distribution slab was placed over the tremie seal before the pier legs were built. These legs tapered from 7 × 9 feet at the base to 5 × 7 feet at the cap. When the two legs had been finished, the cap was formed and poured in place. The steel bridge girders rest on these caps.

Large bascule pier

Although the steps in the construction of the large bascule pier were similar to those for the smaller piers, the larger bascule pier made for different working conditions. The cofferdam for this pier, 70 × 73 feet, was built in water about 30 feet deep at the edge of the ship channel.

Frames for the big cofferdam were fabricated at the dock on the deck of a barge. Three frames were built—one to be installed at the surface, the second at a depth of 11 feet, and the third at a depth of 21 feet. Wales for the top frame were made up of 12-inch WF-65 beams. The second frame had 14-inch BP-73 wales, while the lower frame was fitted with 14-inch WF-150 beams. Struts in the long direction were 12-inch WF-65 beams for all three frames. The struts in the opposite direction were 12 × 12-inch fir timbers. Four-inch pipe posts separated the frames. Careful calculations had to be made in the design of these frames, since all members of the frame had to miss all of the 175 H-piles in the footing.

After a barge had towed the assembled frame into position, six 12-inch round spuds, 80 feet long, were driven to 50 tons bearing through 16-inch wells attached to the frames. Hand winches, mounted on each of the spuds, were used to pick the 77-ton frame off the barge and lower it into place.

The cofferdam was sheeted with MZ-27 sheet piling, 60 feet long, rented from L. B. Foster Co. The McKiernan-Terry 9-B-3 and 10-B-3 hammers drove the sheets.

One of the Bucyrus-Erie 54-B cranes then used a Hayward 1¼-yard orange peel bucket to excavate about 12 feet of material to bring the grade inside the cofferdam down to elevation minus 42 for the base of the tremie seal.

Using a McKiernan-Terry 10-B-3 hammer and a spur bar for the underwater driving, the 54-B cranes drove the 14-inch 73-pound steel H-piles at about 4.5-foot centers in both directions. These piles were 55 feet

long and developed their bearing by friction.

Thick tremie seal

The 12-foot-thick tremie seal for this pier was the biggest concrete pour in the project. The 2,400-yard pour was started one morning and, in spite of several breakdowns, it was completed late the next afternoon.

Four floating cranes, the three Bucyrus-Erie 54-B machines and the Wiley Whirley, assembled around the cofferdam to handle the tremies and concrete buckets. The cranes worked in pairs, one holding the tremie in the proper place and at the proper elevation while the other swung the concrete buckets from the barges to the tremie hoppers.

Ready-mix concrete for the big pour was delivered to the dock in transit mixers and chuted into Gar-Bro 2-yard buckets on barges. Three of these barges, which were used throughout the job, were equipped with Murray & Tregurtha Harbormaster diesel outboard propulsion units. These self-contained units consist of a 225-hp GM marine diesel engine with the outboard gear cases, shaft, and propellor that are similar to the common outboard boat motor. The units, mounted on the deck at the rear of the barge, transform the barge into a self-propelled unit.

Each of these barges carried five of the 2-yard concrete buckets. The transit mixers delivering the concrete carried 5 cubic yards per load, and two truckloads were required to fill the buckets on one barge. In order to speed up the concrete delivery, an additional barge and towboat were rented to augment the three equipped with Harbormasters.

Water is supplied to the jet on the hydraulic fill section by this Gorman-Rupp 4-inch jetting pump powered by a Chrysler engine. At right, reinforcing bars project from piling in place.

The cranes at the pier location picked the buckets of concrete off the barges and swung them to the tremie hoppers. Workmen on platforms attached to the hoppers opened the gates to discharge the concrete into the tremie. Since the heavy buckets and tremies were handled by floating rigs, there was quite a lot of movement of both bucket and tremie. As a bucket emptied and became lighter, it tended to rise. At the same time, the tremie gained the weight lost by the bucket and began to sink. These combined movements kept the workmen alert to avoid injuries and to keep from getting knocked off the platforms.

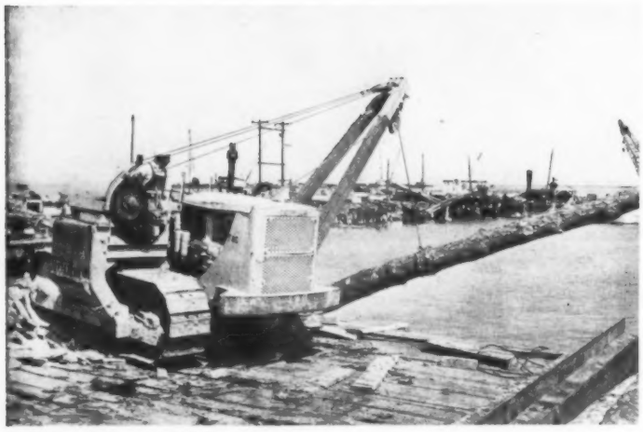
With all units functioning properly, concrete was placed at a rate of about 100 cubic yards per hour. But there were several delays that stretched the total time for the 2,400-yard pour to about 36 hours. This meant pouring throughout the night under a series of 1,500-watt floodlights, powered by Caterpillar generators, that were set up on the barges around the cofferdam.

When the tremie seal had been completed and cured, a pair of Jaeger and Marlow 10-inch pumps removed the water so the pier could be built in the dry. A 9-foot-thick distribution slab was first built on top of the tremie concrete. Forms for this slab were placed 2 feet inside the cofferdam sheeting. The remainder of the pier was poured in two additional lifts; double bulbous rubber waterstops were used in the construction joints to insure watertight outer walls.

Prestressed concrete trestle

The bents of the concrete trestle sections are made up of piles that were precast and prestressed under a subcontract by Whittle Construction Co., Dallas. (See pg. 106.) All the precast sections made by Whittle are being delivered to the trestle site by barge and set directly in place with-

NEW
CP-610
Air Wrench
meets
requirements for
turn-of-the-nut
method
for proper
tensioning of
HIGH STRENGTH BOLTS
New CP-610 Air Wrenches are 7 pounds lighter and 2 inches shorter than any other tool of comparable rating . . . deliver up to 50% more torque output. Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.
Chicago Pneumatic
Pneumatic Tools • Air Compressors • Electric Tools • Diesel Engines
Rock Drills • Hydraulic Tools • Vacuum Pumps • Aviation Accessories
For more facts, use Reader-Reply Card opposite page 18 and circle No. 220



This Cat D7 tractor with Trackson side boom proves very useful in handling piling and timber around the dock area. Here it loads falsework piling on a barge.

out being rehandled.

Prestressed concrete girders will span 50 feet between the bents on the roadway section, and prestressed slabs supporting the railroad track will span 25 feet between bents on the railway section.

These girders have fixed ends at alternate bents and expansion is provided for at the other bents. Fixed bents have 11 piles each, while each of the expansion bents has only 8 piles. Intermediate 3-pile bents under the railroad section reduce the spans on this portion of the structure to 25 feet.

The 24-inch-square piles, from 78 to 106 feet long, have hollow centers formed by 10-inch Sonovoids. The 500 big piles in the 2,100 feet of trestle were being driven by a McKiernan-Terry 10-B-3 hammer handled by the Clyde 35-ton floating derrick. The concrete caps completing the bents were cast in place.

The deck of the roadway section will be made up of six I-shaped prestressed concrete girders resting on the pile caps. The 6½-inch roadway slab, and the diaphragms between the girders will be formed and cast in place. Precast, prestressed slabs that will form the deck for the ballasted railroad section will be made up in units 25 feet long, 10 feet wide, and 2.5 feet thick. Each of these sections contains four 15-inch Sonovoids.

Piling for hydraulic fill

Although the actual dredging of the hydraulic fill for the two end sections of the causeway is being done by a subcontractor, Farnsworth & Chambers placed the concrete sheet piling that forms the protective wall for the toe of the fills. The sheet piling, 15 × 30 inches in section and 15 to 27 feet long, were precast by Whittle.

Before a pile was set, a hole was jetted down to approximate grade by a double-barrel jet shaped like a hairpin. The jetting pipe was handled by a Koehring 605 crane, while the water pressure was provided by a Gorman-Rupp Model 7301 4-inch jetting pump powered by a Chrysler industrial engine. The crane then lowered the pile into the hole and continued jetting until the pile was down to grade.

Once the sheeting had been placed, forms were built and a reinforced cap was poured to tie all the piles together so that the dredge could begin filling the space inside the toe wall. This fill is being brought up to grade with sand dredged from the bottom of the channel.

Personnel

Supervising the Phase 1 work for Farnsworth & Chambers Co., Inc., was general superintendent E. D. Strickler. Assistant superintendents were John Emmitt and Jim Hutchinson, and project engineers were Stanley E. Smariga, P. E.; Ross Finke, P. E.; and Jim Langley, P. E. Representing the Galveston Navigation District and Parsons, Brinkerhoff, Hall & Macdonald is resident engineer A. M. Alpert. THE END

Backfilling attachment handles 700 tons daily

■ An improved conveyor attachment for backfilling ditches, trenches, curbing, or pipelines, designed to place material from dump trucks, is available from the Power-Pack Conveyor Co. The conveyor attaches to the hauling vehicle and delivers material up to 8 feet beyond the side of the truck at heights up to 3 feet.

The unit features an adjustable discharge reflector for control of material placement. Belt speed and amount of material delivered to the belt are both controlled from the

The NEW cedarapids bituminous paver

introduces an entirely new concept in bituminous paving

Imagine a bituminous paver *with an electric vibrating* screed and a *controlled vibration intensity* that not only compacts bituminous mix into a smooth, uniform high-density mat, without segregation . . . but is setting new records for high-speed, high-capacity paving!

Imagine a bituminous paver that has *placed material from ten 14-ton trucks in 15 minutes* . . . that can hit paving speeds up to 102 ft. per minute . . . with the finished pavement free of voids or tears in the mat, and testing as good as pavement laid at much slower speed!

Imagine a machine so simple in design and so ruggedly built that a test model operated for 935 hours, over 385 miles, *with practically no mechanical difficulties*, and showing very little wear!

THAT'S THE NEW CONCEPT IN BITUMINOUS PAVING . . . achieved with the many new and different design features of the all-new Cedarapids Bituminous Paver.

HERE'S HOW YOU PROFIT WITH THIS NEW, DIFFERENT PAVER

Greater Speed and Capacity
Tests have proved that the paving speed and capacity of the new Cedarapids Bituminous Paver are generally limited only by the output of the mixing plant, truck movement, or the ability of the rolling equipment to keep up. Paving speeds range up to 102 FPM. Rapid vibration of the screed assures maximum density at any paving speed, without tearing the mat or creating voids. Capacity is conservatively rated in excess of 200 tons per hour.

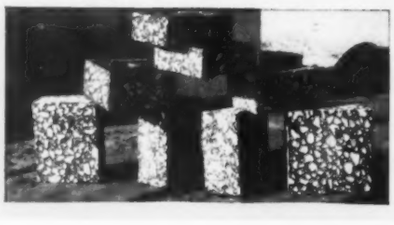
Simplified for Lowest Maintenance
Simplified design means more "go" time and less down time. A number of troublesome chains, drive shafts and universals have been eliminated. This reduces the number of wearing parts and mechanical drive linkages required. See the table for comparison with other leading pavers!

	Chains	V-belts and drives
Cedarapids Paver	6	2 belts with 1 drive
Paver A	15	5 belts with 5 drives
Paver B	12	10 belts with 4 drives
Paver C	17	9 belts with 3 drives

Assures Better Quality Pavement
The new Cedarapids Paver meets the most rigid specification demands of the Federal Highway Program. On turnpike tests, inspectors found paving mixes spread by this machine to be uniform as to density, surface texture and desired thickness. Careful examination of dozens of density samples from unrolled areas of both binder and surface course revealed no segregation . . . neither open textured areas where coarse aggregate predominated, nor segregation by particle size.

Automatic depth controls assure the proper amount of material in front of the screed at all times with no attention from the operator . . . an important feature for preventing voids when paving at high speed. Steering is easy. Long screed support arms pivot well forward on the Paver, with a ball joint connection which allows minor side movement of the screed to assure straight mat edges and even joints on the straight-away as well as on curves. The long screed arms and long crawler base provide maximum screed floating action to minimize irregularities in the subgrade.

These exclusive Cedarapids design features result in highest quality pavement, with the riding quality demanded by safety for today's high speed travel.



These pavement cross sections are typical random samples cut from both binder and surface courses of the Kansas Turnpike. Such uniform distribution of coarse and fine aggregate is typical of pavement laid with the new Cedarapids Bituminous Paver.

The Power-Pack backfilling conveyor attachment delivers material up to 8 feet beyond the side of the hauling truck at heights up to 3 feet.

operator's position and can be changed while the unit is in operation. The conveyor is attached to the hauling vehicle through a cable hitch.

The belt is powered by an 8-hp gasoline engine. It has a capacity of 3 tpm and can unload and distribute more than 700 tons per day using only two men, according to the manufacturer. The capacity of the hopper is 2 cubic yards.

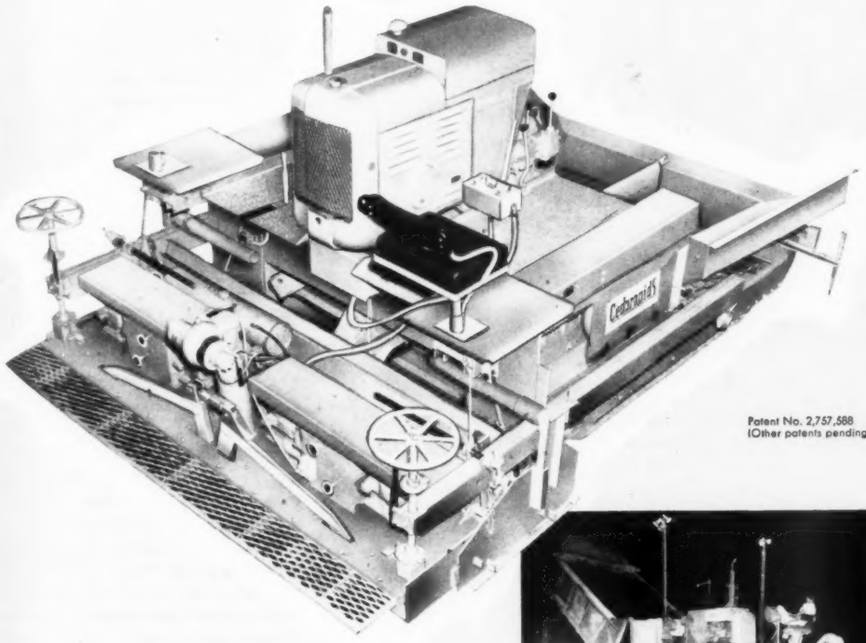
For further information write to the Power-Pack Conveyor Co., 13910 Aspinwall Ave., Cleveland 10, Ohio, or use the Request Card at page 18. Circle No. 74.

Making tractors do more

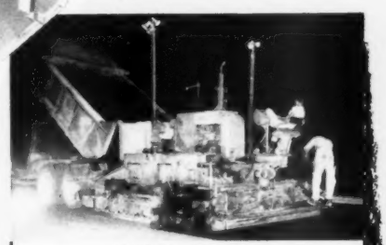
■ How the addition of the right tractor job attachment increases the production and profit on virtually all types of construction operations is covered in a catalog from the Hyster Co. According to the catalog, all Hyster tractor job attachments offer the advantage of Caterpillar-built tractor mobility and maneuverability combined with the extensive power of Caterpillar diesel engines.

Shown in the booklet are the complete line of tractor-mounted accessories for Cat-built tractors, including heavy-duty towing winches, worm-drive winches, and the Hyster Yarder. Also presented is the Hystaway excavator-crane attachment, which can be equipped as a dragline, clamshell, crane, pile driver, shovel, or backhoe.

To obtain Form No. 1416 B write to the Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg., or use the Request Card at page 18. Circle No. 93.



Patent No. 2,757,588
(Other patents pending)



TESTED AND PROVED
ON THE KANSAS TURNPIKE

This Cedarapids Paver was used by Reno Construction Company to lay 130,000 tons in a little over two months on the Kansas Turnpike. Operating day and night, the Paver laid 3,475 tons, or all the mixing plant could supply, in one 16-hour period. Note the relaxation of the operator. Finger-tip operation, with no foot controls, adds to the Paver's easy handling.

HERE ARE A FEW OF OVER 40 NEW FEATURES

- Four individually controlled, electrically driven vibrators deliver 3,600 impulses per minute to screed.
- Automatic feed conveyors and spreading screws.
- Completely self-cleaning track-type crawlers reduce maintenance, prevent screed-disturbing build-up of material.
- Big hopper handles up to 9 tons of material.
- Paving widths easily adjusted . . . no tamper or cut-off bar to consider.
- Electric clutches and brakes minimize wear.

IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Cedarapids
Built by IOWA

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa, U. S. A.
Gentlemen: Please send Bulletin PAV-1 and further details of your new Bituminous Paver.

Name_____
Company_____
Address_____
City_____ Zone____ State_____

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 221

ASTM Building Codes Standards revised

A 1956 supplement including revisions of the 1955 ASTM Standards in Building Codes has just been published. Containing 224 pages, the book includes new ASTM standards that have been adopted for construction materials since the book was first published last year.

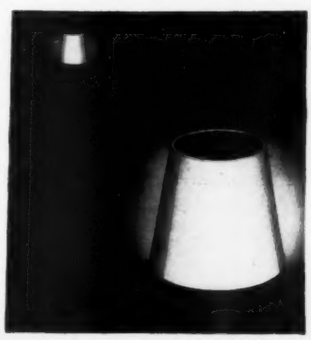
New specifications and test methods are listed and described. The full range of construction materials including structural and reinforcing steel; steel, cast iron and copper pipe; building units; bituminous roofing; cement; gypsum; ready-mixed concrete; and other materials are covered. The book is helpful to architects, engineers, building code authorities, and contractors in the building construction field.

Reflector caps increase traffic cone efficiency

■ The efficiency of traffic cones is reportedly doubled with the use of reflector caps manufactured by the A & B Reflectorizing Co. The caps are constructed of white or red Scotchlite permanently bonded to heavy-gage aluminum.

Recommended for all traffic cones, regardless of size, the caps fit the cones easily and require little maintenance. They are 3 inches in depth.

For further information write to the A & B Reflectorizing Co., Dept. P-206, 5508 N. Halifax, Arcadia, Calif., or use the Request Card at page 18. Circle No. 75.



A & B reflectorizing caps are made of red or white Scotchlite permanently bonded to heavy-gage aluminum.

A Lorain crane works from the temporary work bridge next to the bridge being built across the Yadkin River on the Salisbury bypass.

Grading, paving, bridge work put bypass program in high gear

Grading, paving, and bridge construction recently brought to completion two different bypasses built in North Carolina under the state's large scale program of bypass construction to separate local and through traffic in heavily populated areas.

One of these was the major relocation of U. S. 421 for the 14-mile stretch between Greensboro and Kernersville, the other was the bypass relocation of U. S. 29 around Salisbury between Lexington and China Grove.

The first of these jobs to get under way was the $375,000 relocation of U. S. 421, a project involving 7 miles of grading on the highway. This required 1,200,000 cubic yards of roadway excavation with balancing maximum cuts and fills of about 32 feet, together with the removal of about 3,000 cubic yards of rock. The six structures and four culverts needed on this stretch were built under a separate contract as the earthmoving work—subcontracted to Burke Smith Construction Co., Walnet Cove, N. C.—was being done.

Burke Smith's large earthmoving fleet moved more than 137,000 cubic yards of earth in 18 nine-hour days with two LeTourneau-Westinghouse 16-yard rubber-tire scrapers, two Caterpillar DW20's, a LeTourneau-Westinghouse 18-yard scraper pulled by a Cat D8, and a LeTourneau-Westinghouse 10-yard scraper pulled by an International TD-18 tractor.

The scrapers worked with a fast loading-dumping cycle, for the contractor kept the average haul distance to about 1,000 feet. This haul distance was most economical, since most of the work consisted of roadway grading. Only 150,000 yards of borrow was taken from a roadway cut section which the contractor widened so that a borrow pit would not have to be set up.

As soon as the scrapers had been loaded to capacity by Caterpillar D8 and International TD-18 tractors, they traveled the haul distance to deposit a 3 to 6-inch layer of fill without slowing down, then returned to the loading point to start the cycle over again. The complete cycle took 70 to 90 seconds.

A Caterpillar D7 tractor-dozer was used for rough grading and to spread the fill material. Compaction was achieved by routing the scrapers over the fill and by rolling the material with a Tampo sheepsfoot roller

Anthony R. Massa
President

Henry E. Massa
Executive Vice-Pres.

Frank W. Massa
First Vice-Pres.

Manfred C. Massa
Second Vice-Pres.

Vincent C. Massa
Sec'y. and Treas.

John S. Massa
Asst. Sec'y. & Treas.

Rudolph V. Massa
Chief Estimator

Massa Brothers, Inc., Pennsylvania contracting firm, employing more than 50 masons, saved thousands of dollars.

"We Slashed LABOR COSTS in Half with an..."

american ECONMOBILE

HEAVY DUTY HI-LIFT HYDRAULIC LOADER

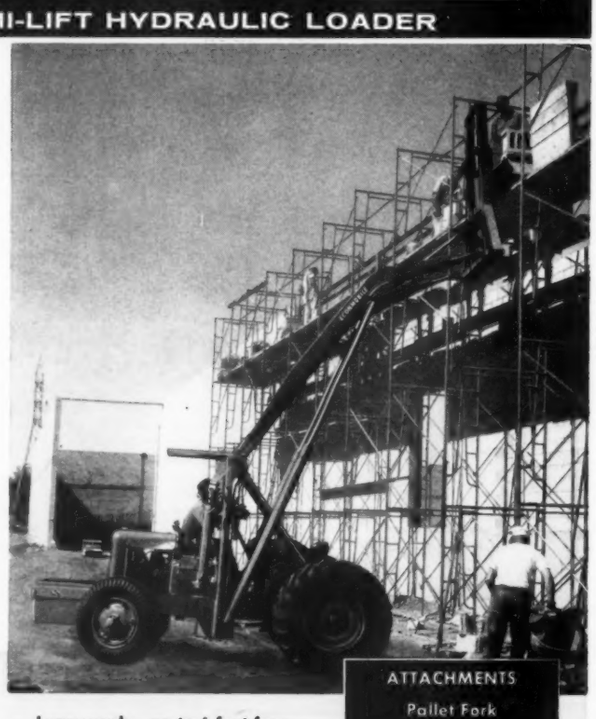
Here are the FACTS described by Massa Brothers, Inc.

"Gentlemen: This Econmobile did wonders for us. It kept 40 to 60 bricklayers working eight hours a day, five days a week, for eight months. Our labor costs were cut in half, and that is a lot of money saved on a project which ran 1½ years from start to finish. This project consisted of two schools, and we had to furnish, distribute and install 60,000 glazed tiles, 300,000 blocks and 500,000 bricks."

How Did They Save Half?

Massa Brothers says: "The Econmobile, in spite of rain and mud, was always working, hauling materials, masonry and mortar mix from storage site to actual installation (eliminating most of the jobs that were normally done by helpers — and doing them more economically and efficiently.) It paid for itself many times over."

Available with full Torque Converter or straight mechanical transmission



These Are the Advantages That Made These Savings Possible

Hoisting Height of 18 feet. (Auxiliary tower goes up to 22 ft.)
2500 pound Payload Capacity

Long reach—up to 6 feet from tractor wheel to heel of fork.
Automatic Self Leveling
Fast and Mobile
90% Use Factor

ATTACHMENTS
Pallet Fork
Concrete Hopper, ½ cu. yd.
Tower, 4' Lift
Aggregate and General Purpose Buckets
Dozer Blade
Work Platform
Chain Boom

Write today for the Cost Cutting Facts about Econmobiles.

AMERICAN ROAD EQUIPMENT CO.
4203 North 26th Street, Omaha, Nebraska

For more facts, use Reader-Reply Card opposite page 18 and circle No. 222

Scrapers hold to fast loading-dumping cycle on relocation job; cofferdams and work bridge used to build long span on bypass

This Koehring backhoe, which excavated drainage ditches along the relocated road, here places 24-inch concrete drainage pipe sections in a ditch.

pulled by an International tractor.

Shale, encountered along a 600 foot stretch of a cut area, was broken up by a ripper attachment mounted on a tractor. This ripper bit 2 feet into the shale, breaking up the stratum enough so that scrapers, rather than a shovel, could load the material and haul it directly to fill areas. The 3,000-yard stretch of rock was blasted out after it had been drilled with a Chicago Pneumatic wagon drill powered by an Ingersoll-Rand air compressor.

During the grading operations along the 260-foot-wide right-of-way, a Koehring crane worked with either a dragline or clamshell bucket, and a Koehring backhoe excavated the many ditches required for 24-inch concrete drainage pipe. Fine-grading, which completed this contract, was handled by a Caterpillar No. 12 motor grader.

Under another contract, a 14-inch crusher-run stone base course, put down directly on the grade, was topped with a 3-inch rolled stone mat. This course was surface-treated with asphalt and choked with fines.

The two 24-foot roadways, separated by a 30-foot depressed grass median and with 15-foot outside shoulders, were then opened to traffic. After about a year, the roadway will be patched and an asphaltic concrete binder and wearing surface put down. On this project, Burke Smith, the owner of the firm, was the superintendent and Jake Frietag was the grading foreman. R. L. Hickerson was the resident engineer for the State Highway and Public Works Commission.

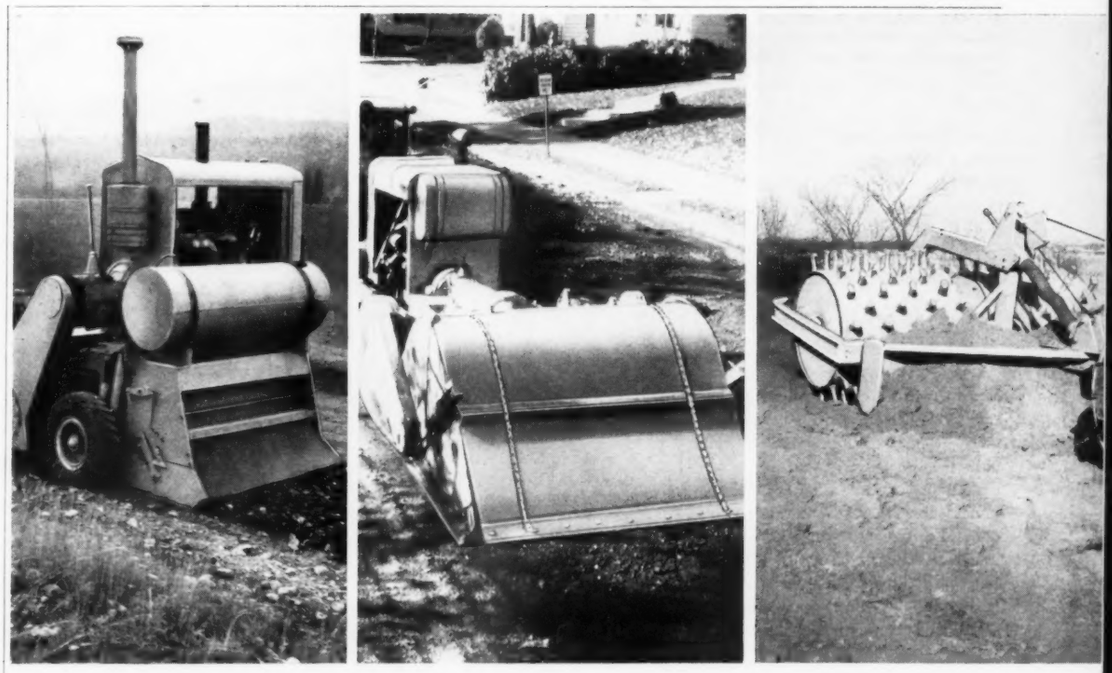
Bridge contract on bypass

Construction of bypasses in the state also involved a considerable amount of bridge work—a $980,000 contract alone going to Foster & Creighton Co., Nashville, Tenn., for all the structures north of Salisbury on the Salisbury bypass. Altogether, this contract called for the construction of 14 bridges and two culverts. The shortest structure is 160 feet long, while the longest—spanning the Yadkin River near the northern end of the bypass—is 883 feet 4 inches long. This bridge consists of two abutments and ten reinforced-concrete piers spaced on 80-foot centers.

Since the maximum depth of the river was 18 to 20 feet and the minimum a few feet, the contractor built

(Continued on next page)

For more facts, circle No. 223→



Bros shows Road Builders 3 ways to reduce roadbed costs in '57

Subbase and subgrade materials from native or over-size rock

Montana photo (left) shows how the Bros PREPARATOR is making substantial savings on subbase costs by reducing native rock at the rate of up to 400 cu. yds. per hr. 22 special alloy steel hammers driven at high speed break rocks along cleavage lines; accepted gradation percentages and clean, sharp angles of friction result in the materials produced. Easily handles up to 24" diameter stuff. It can be towed by any 40 to 50 HP tractor.

This machine is also a real money-maker in pulverizing old blacktop materials for re-use. Reduced to uniform size, materials are easily blended with new asphalts.

Base and surface course materials mixed faster and to greater depths

Minnesota photo (center) shows the Bros ROTO-MIXER using every bit of its "beef" in mixing old road materials full of big rock, slab-like asphalts and cobblestones; heavy-duty design brought it through without damage. The machine features a 6" solid steel rotor shaft; simplified split-sleeve tool plates, load absorbing tool sockets, variable speed transmission and independent hydraulic control of the hood and the rotor.

These features add up to correct control of mixes, minimum of repair and breakdowns and deeper and faster mixes.

Earthfill materials bladed and compacted in one operation

Minnesota photo (right) shows Bros LEVEL BLADE ATTACHMENT combining grading and rolling into one operation on a regrading project. This dual effort eliminated a patrol grader from the embankment job. Consolidation allowed scrapers to run in high gear; two to three extra hauls per hour were reported. Equal or greater densities than giant tampers achieved on this project also resulted from this combination blade-roller work.

Consolidating old roadbed materials in a horizontal stockpile with the blade-roller permits scrapers to spread on top without bogging down. Spring-loaded blade has 7½" vertical adjustment for cross-overs and grading in gumbo.

• • •

Cost savings vary from job to job, but the best way to make maximum savings on roadbed construction is by putting this Bros equipment to work for you. (And don't forget about our tremendous pneumatic tired roller line.)

BROS 75TH YEAR

ROAD MACHINERY

WM. BROS BOILER & MFG. CO.

1057 Tenth Ave. S.E. • Minneapolis 14, Minnesota

Fast grading on the U. S. 421 relocation project accounts for 137,000 cubic yards of earth moved in 18 nine-hour days. This LeTourneau-Westinghouse 16-cubic-yard scraper is being push-loaded by a Cat D8.

a temporary timber work bridge, rather than using barges, to support the crane driving the sheeting for the cofferdams, placing concrete, and erecting the steel superstructure.

This work bridge, spanning the river adjacent to the bridge location, was supported on timber pile bents spaced on 12-foot 6-inch centers. Each bent, consisting of four vertical and two battered piles, was capped with a 10 × 10-inch timber cap 14 feet long. Four I-beams, 16-inch 40-pound sections that were 25½ feet long, were used as stringers and so spaced that a pair was under each track of the crane. This done, the stringers were covered with a 3-inch-thick flooring of 16-foot-long oak timbers to give the work trestle enough width to support the crane as well as workmen.

Eight 76½-foot-long turnouts were built perpendicular to the trestle, between the cofferdam locations, to facilitate work on the cofferdams. These, similar to the trestle, but with an extra 16-inch I-beam stringer, were located directly at the pickup point of the steel girders of the superstructure. This made it possible for the 80-foot girders to be set in place by a Koehring 604 crane with a 60-foot boom and 15-foot jib. This same crane was also used to build the work bridge and the turnouts.

The contractor formed the 61 × 18-foot cofferdams by driving 30-foot-long interlocking sheeting with a McKiernan - Terry 7-B hammer mounted on a Lorain crane. Enough sheeting for two cofferdams and enough steel sections for the three rings in each cofferdam were available throughout the job. The cofferdam rings, placed 6 and 9 feet apart, measured from the bottom of the cofferdam, were made out of 12-inch 53-pound H-beams.

After being fabricated and braced both vertically and horizontally, the rings were placed on floating oil drums, brought out to the pier location, positioned, and then tied by twelve H-53 bearing piles that were driven as temporary studs. Once the rings had been positioned, the oil drums were removed and the rings fell and settled at the bottom of the river.

As soon as two cofferdams had been built, they were unwatered by gasoline driven pumps, among them two Jaeger 8-inch pumps and a Marlow 10-inch unit.

Smaller pumps kept the cofferdams dry while work was in progress on the pier footings. These pumps included one 6-inch, two 4-inch and four 2-inch units. Pier footings, used for the majority of the piers, consisted of three 13 × 6½-foot reinforced-concrete pads, 30 inches thick, under each of the three pier stems. Footing pads were used directly on bedrock, which was excavated for about 12 inches to accommodate the pads.

Only three piers required additional support. This took the form of 12-inch H-piles, 15 to 30 feet long, driven to a 30-ton bearing. In this case, the footing pads were made 36 inches deep to encase the top of the piles and tied together by reinforced-concrete struts 3 feet wide × 2 feet 3 inches deep. A Vulcan No. 1 hammer mounted on the Koehring crane handled the job of driving the foundation piles.

Formwork

In building up the triple-stemmed piers, which have a ¾-inch per foot

100 SERIES

MODEL	175 BC	175 BT	195 BT
CAPACITY	½-yard	12½-tons	15-tons

AMERICAN ADDS 5 NE

Two new series—five *new* rubber and crawler mounted models now make a complete line of American Cranes available—bucket capacities from ½ to 2-yards, lifting capacities up to 50 tons!

Many basic design features of American's job tested and proved 300 and 700 Series machines are now engineered into the new ½-yard and ¾-yard series. Major features include: a rugged one piece cast steel carbody with integral roller path, bullgear and supporting vertical ribs . . . four improved design hook rollers that result in smoother swings, longer roller and roller path life . . . operator engineered control systems to increase safety, operator efficiency and production rates . . . a high gantry easily raised or lowered without extra manpower plus a power raised, lowered counterweight! The new 100-200 Series, like the well known 300 and 700 Series, offers far greater boom strength at less weight with its new pipe-laced boom now standard on all American Cranes. Backhoes feature the exclusive adjustable pitch bucket that can be set for maximum digging efficiency at every depth within its range. Spillage, even when truck loading, is drastically reduced! All these, plus many more equally important engineering advances add up to make American Cranes the best buy for top production on every assignment.

Work-ability of these compact, but tough 100 and 200 Series Americans is as amazing as their low initial, low operating costs! These ground hugging crawlers handle any front—work efficiently even on the roughest terrain! On rubber, they roll faster to the job—work faster on the job. They're highly maneuverable and take any front!

You'll find the 100 and 200 Series' wide open machinery deck layout an invitation to frequent, thorough preventive maintenance—an important cost cutting feature.

Reaching the fill, the LeTourneau-Westinghouse scraper deposits its load in 3 to 6-inch layers without slowing down or stopping.

batter on the outside columns and a vertical middle column, the contractor used formwork fabricated on the job. SkilSaws and Sioux saws, powered by three portable 110-volt generating sets, were used in fabrication.

The pier columns and the bottom tie beam connecting the stems had to be formed while the cofferdam sheeting was still in place, since the tie beams are at an elevation below normal water level.

All of the lower tie beams are at the same elevation; the distance between the lower and upper tie beams varies because the bridge is on a 3 per cent grade and the upper tie beams are spaced exactly 6 feet below the deck of the bridge. All the tie beams measured 2½ feet wide and 3 feet 4 inches deep.

Forms for the pier columns were fabricated with ¾-inch plywood facing, backed with 2 × 6-inch sheeting, 2×6-inch studs, and 6×6-inch walers. Horizontal forms consisted of ¾-inch plywood backed with ¾-inch-thick tongue-and-groove sheeting. Vertical forms were removed after 24 to 48 hours, depending on the temperature of the air. But horizontal forms were left in place for 7 days.

As concrete was delivered by ready mix trucks, it was dumped into concrete buckets that were handled by the Lorain crane located on the trestle. Pours, consolidated by Mall electric vibrators, were cured with a sprayed compound after concrete had attained initial set. After the lower tie beam had been formed, the contractor was able to remove the interlocking cofferdam sheeting with a McKiernan-Terry extractor mounted on the Koehring crane.

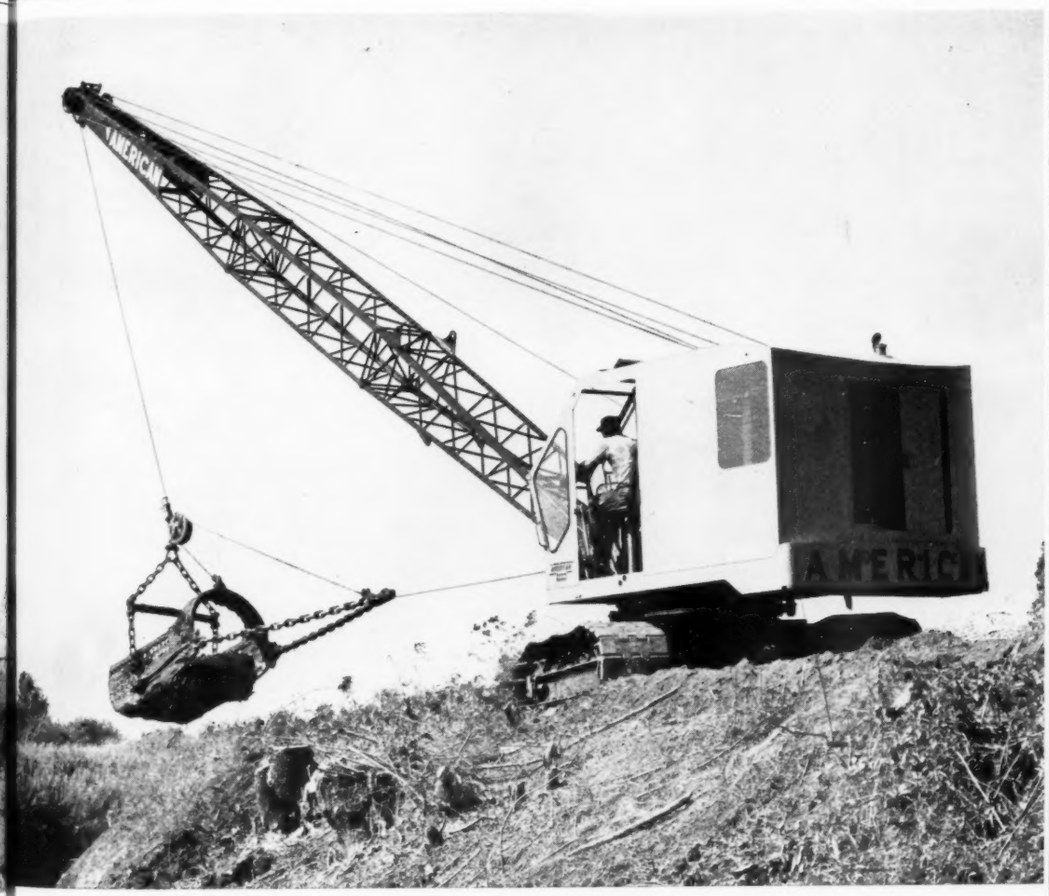
The top 3½ feet of the pier columns, the 57-foot long 3½-foot-wide cap, and the 2½-foot-wide soffit under the cap were cast monolithically on the piers.

Steel erection

Erection of the 1,770,000 pounds of structural steel, fabricated by American Bridge Co. at Roanoke, Va., was handled by the Koehring crane with a 60-foot boom and a 15-foot jib. The steel was shipped by rail from the Roanoke plant to a railroad spur of the Duke Power Co's. plant. Here, where the contractor built a bypass bridge over the spur, the steel was unloaded and stored. A total of 3,325,000 pounds of steel for all the structures on this contract were shipped, unloaded, and stored in the same way. Heavy duty pole trailers were used to haul the structural steel members to the different bridge sites.

Ten girders, spaced on 6-foot 3-inch centers along the caps, consist of 80-foot-long 36 WF 150 sections. The contractor started steel erection by placing ten 96-foot-long girders for a span so that a 16-foot cantilever resulted. From this point on, the 80-foot girders were placed to form other 16-foot cantilevers. This procedure eliminated the need for any falsework and made it possible for the girders to be erected from the work bridge turnouts that were used during cofferdam construction. Bolted girder connections were handled with three Chicago Pneumatic air impact wrenches powered by Gardner-Denver 210 and Chicago-Pneumatic 105 air compressors. Later, the connections were riveted.

The formwork for the 7-inch-thick



200 SERIES

MODEL	275 BC	275 BT
CAPACITY	¾-yard	22½-tons

NEW MODELS TO LINE

Designed from the ground up means just that when you're talking about American design. Every machine, 100 through 700, is capacity engineered from the first rough sketches during its design—capacity manufactured through the final stages of its construction! Every part of an American crane has to handle its share of the work load—a weak link means costly down time for you! That's why American engineers capacity-check every part from the smallest bolt to the longest boom. They make sure every part is more than strong enough to handle its share of your job!

Designing and building quality cranes and hoists is a big part of American Hoist's responsibility to its customers. Another responsibility is to establish a top notch distributor-service organization. American distributors send their service men to factory schools conducted right on the assembly line, not in "class" rooms! Visit your American distributor for the complete story.

AMERICAN HOIST
and Derrick Company
St. Paul 1, Minnesota

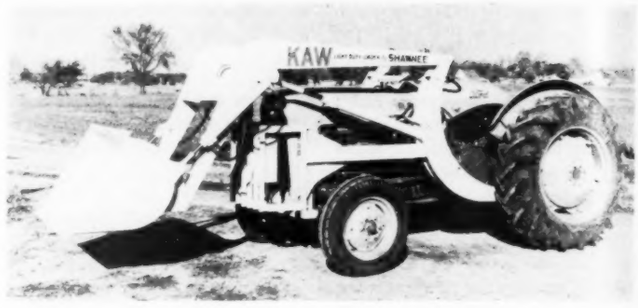
For more facts, use Reader-Reply Card opposite page 18 and circle No. 224

reinforced-concrete deck was removed with a floating scaffold built on empty 55-gallon oil drums and pulled around under the deck by a Lorain 240 crane. The completed roadway, between curbs, is 56 feet, providing for two 24-foot lanes of traffic. On this project, J. W. Markham was the superintendent for Foster & Creighton Co. and J. A. Kennedy was the resident engineer for the state.

These two projects provide a sampling of the vast amount of bypass work—and the variety of construction involved in such work—throughout North Carolina. Major work besides these two projects includes the grading and structure projects for the relocation of U. S. 301 which is being brought up to the high Interstate Standards. This work extends from Kenly to Benson. Current or recent projects are also bringing bypasses around a number of other cities and towns, among them Greenville, Kinston, and Wilson on U. S. 301, Goldsboro on U. S. 70, Henderson on U. S. 1, Sanford on U. S. 15, and Laurinburg, Reidsville, Charlotte, and Kings Mountain on U. S. 501. THE END

Hough appoints assistant

Robert D. Schwartz has been appointed by the Frank G. Hough Co., Libertyville, Ill., as the new assistant to Madison L. Crawford, advertising manager. Schwartz has previously been with Arthur Grossman Advertising, Inc., of Chicago, Ill.



The Kaw loader has a 10-cubic-foot roll-back bucket actuated by twin 2-inch double-acting hydraulic cylinders, and can raise 1,250 pounds to a 9-foot dumping height.

New utility loader has 10-cubic-foot bucket

■ A new utility loader with a 10-cubic-foot roll-back bucket actuated by twin 2-inch double-acting hydraulic cylinders is announced by the Shawnee Mfg. Co. The Kaw loader fits Ford and Ferguson tractors.

The lifting cylinders have a $2\frac{1}{2}$-inch bore and are capable of hoisting 1,250 pounds to a dumping height of 9 feet. The hydraulic system is comprised of an 11-gallon crankshaft-driven pump with permanent piping and 1,000-psi by-pass protection. The controls are of the fingertip-type and are located at the right of the steering wheel.

According to the manufacturer, the operating cycle for the loader is five seconds to full dumping height and three seconds to the down position. The Kaw loader is said to be ideal for applications where a single tractor is frequently used with other attachments, because of its low cost and simple two-pin installation.

For further information write to the Shawnee Mfg. Co., 1947 N. Topeka Ave., Topeka, Kans., or use the Request Card at page 18. Circle No. 96.

Colorless repellent lets trapped moisture escape

■ A new colorless water-repellent liquid masonry coating that preserves and protects masonry while permitting its pores to "breathe" so that trapped moisture can escape is available from Everseal Mfg. Co., Inc. The coating is called Inviso.

Applied like paint in a single coat, Inviso is invisible and stainproof. It is recommended for brick, concrete, limestone, cinder block, stucco, cement and asbestos siding, and other outside surfaces. It can be applied by brush, or sprayed directly from the container in temperatures as low as 15 degrees F.

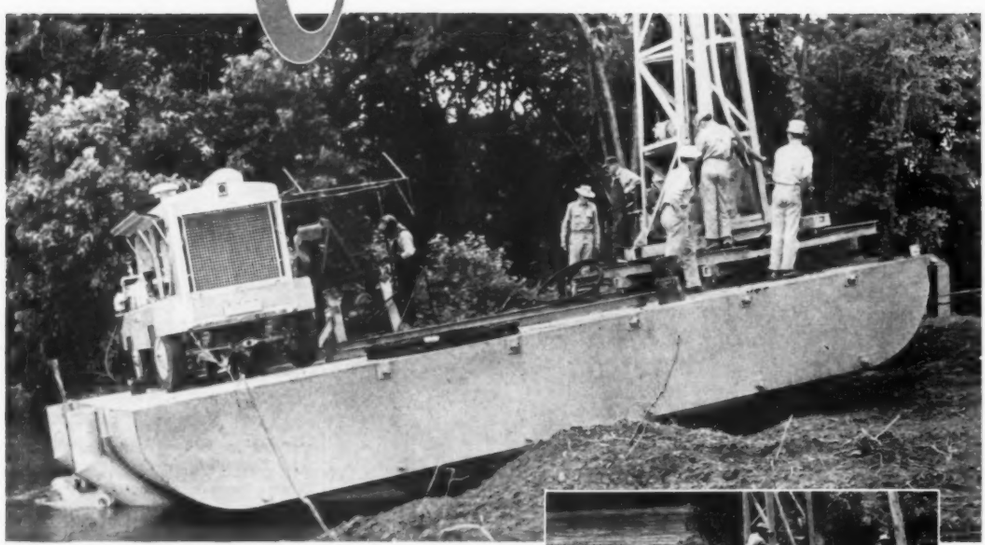
In Army and Navy tests, the manufacturer reports, the coating was applied to exterior brick, concrete, and cinder block surfaces, some of which had been leaking badly due to their location near a sea wall. About 24 hours after the application, the surfaces were subjected to a severe high-pressure hosing for 30 minutes. Interior surfaces were tested with a moisture meter during and after the hosing. The results indicated that no moisture had penetrated.

For further information write to Everseal Mfg. Co., Inc., 252 W. 57th St., New York 19, N. Y., or use the card at page 18. Circle No. 97.

30" PIPELINE CROSSES POTOMAC

with the aid of a drill-barge-mounted

GYRO-FLO PORTABLE



Unique submarine drill barge, built by Associated Pipe Line Contractors, Inc., is powered by a standard Ingersoll-Rand 600 cfm Gyro-Flo portable compressor

Associated Pipe Line Contractors, Inc., recently completed laying a 30" line across the Potomac River near Rockville, Md. The river at this point was 2800 feet wide with a bed of solid rock.

This difficult rock drilling problem was solved by using the all-steel drill barge shown above, built by Associated. On it are mounted an Ingersoll-Rand SD-65 Submarine Drill which is powered by a 600 cfm Gyro-Flo portable air compressor. The Gyro-Flo is anchored aboard without removing the running gear, thus leaving it available for on-land drilling work.

This river crossing is a part of Associated's 80 mile section of Transcontinental Pipe Line Corporation's main line looping program from Texas to New York. The Gyro-Flo mounted on the barge was only one of a number used on this project, and these compressors, together with other Ingersoll-Rand rock drilling equipment gave their traditional trouble-free performance.

Wherever contractors need dependable, low-cost air power, they agree that "there's only *one* Gyro-Flo". Ask your Ingersoll-Rand representative to give you the complete story.

Ingersoll-Rand

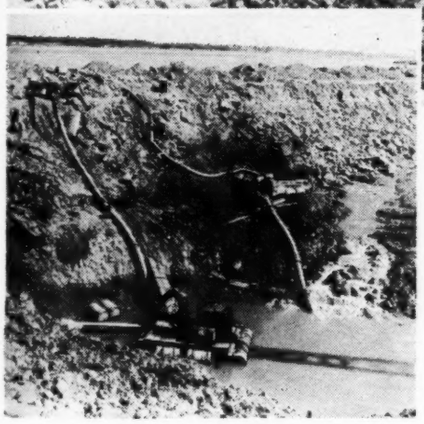
2-396

11 Broadway, New York 4, New York

AN UNBEATABLE COMBINATION . . . GYRO-FLO COMPRESSORS AND I-R ROCK DRILLS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 225

SEEPAGE WATER ON ST. LAWRENCE SEAWAY CONTROLLED WITH EFFICIENT PUMPING



These two Marlow self-primers pump water from a collecting basin up over a 30-foot bank to discharge it into the St. Lawrence River.

This 10-inch, engine-driven Marlow self-priming pump and a companion Marlow, that was mounted on a raft, operated on a 24-hour schedule to control seepage water.

Marlows Work 24 Hours a Day to Keep Seaway Excavation Workable

Before starting work on the main channel improvement at Galop Island in the St. Lawrence River, it was necessary to reduce the speed of flow by diverting water through a relief channel. This channel was dug on the American mainland near Red Mills, New York. When the excavation was started, a cofferdam was built at the upstream end of the job to hold back the water until the work was completed.

Seepage water became a critical problem as the digging progressed to a grade below the level of the river. To control the seepage, Morrison-Knudsen Co., Inc., installed two big Marlow self-priming contractor's pumps. The pumps were located at a collecting basin at a low point of the excavation. One of the skid-mounted, 10-inch pumps was mounted on the bank, while the other engine-driven unit *was placed on a raft that was floated in the basin!* Both pumps were used during peak periods to carry water up over the 30-foot embankment and into the river. While the pumps have a combined capacity of 360,000 GPH on continuous service, they can actually handle up to 400,000 GPH in emergencies.

In addition to a complete line of AGC rated self-priming centrifugal pumps, Marlow also builds the famous "Mud-Hog" diaphragm pump that handles muddy and trash-laden liquids. All these pumps are readily available from any of the three strategically located Marlow plants. Look for the heading "Marlow Pumps" in the "yellow pages" of your Classified Telephone Directory or ask your Marlow dealer about Marlow's contractor's pumps.

Marlow PUMPS

6-272

DIVISION OF

BELL & GOSSETT CO.

Midland Park, N. J.

Morton Grove, Illinois Longview, Texas

For more facts, use Reader-Reply Card opposite page 18 and circle No. 226

Rubbertex, an asbestos-base puncture sealant, is injected into tubes or tubeless tires while the tire remains on the wheel.

"I warned you not to kick the tires."

Asbestos-base liquid eliminates flat tires

■ A new type of liquid puncture sealant that is injected directly into tubes or tubeless tires while the tire remains on the wheel and is said to eliminate flat tires is available from the United Rubbertex Corp. Rubbertex is a special asbestos-base liquid that reportedly cannot freeze, gum up, or change characteristics under temperature extremes.

When a nail or sharp object penetrates the tire, Rubbertex prevents any loss of air pressure by clinging to and sealing the intruding object. After the object is removed, Rubbertex seals the puncture permanently and automatically as the tire rolls.

The sealant is non-flammable and will not chemically or mechanically affect the operation of the tires or tire valves. It is recommended for use by construction fleets as a means of reducing down time and wasted man hours caused by flat tires.

For further information write to the United Rubbertex Corp., 260 Madison Ave., New York, N. Y., or use the Request Card at page 18. Circle No. 98.

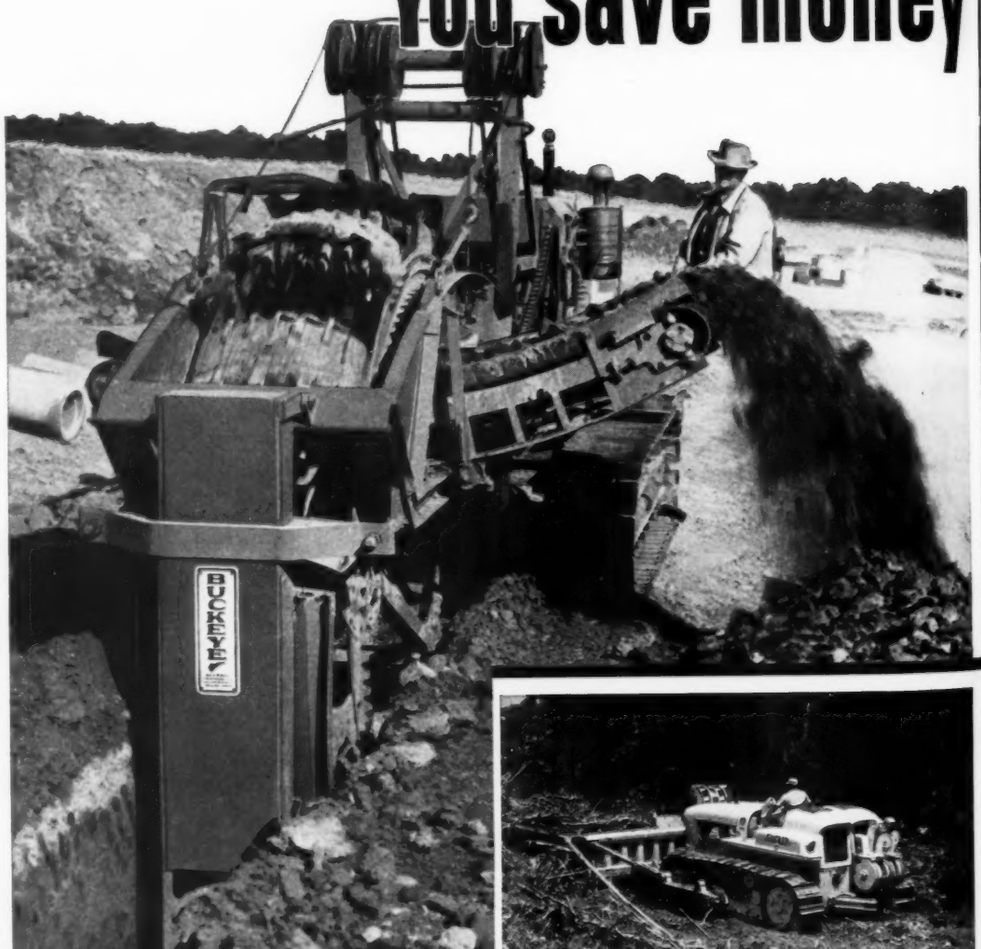
Anti-stripping additive

■ An anti-stripping additive that facilitates the coating of wet aggregates with liquid bituminous materials and increases the resistance of bituminous films to stripping in the presence of moisture is described in literature from the Lancaster Chemical Corp. Kling additive is available in two standards: Kling XX (double strength) and Kling D (commercial type). One drum of Kling XX is said to be equal in strength and efficiency to two drums of any commercial additive.

Other desirable features of the additive include maintenance of the compressive strength of the bituminous mixture and reduction in the loss of stability due to the detrimental action of water. Kling can be added to and mixed with such liquid, bituminous materials as cutback asphalts, road oils, and road tars, for convenience in construction during bad weather and for greater durability of the finished pavement.

To obtain this literature write to the Lancaster Chemical Corp., Broad and 13th St., Carlstadt, N. J., or use the card at page 18. Circle No. 58.

You save money on



The Gar Wood Dozecaster has the stamina required by Euclid's powerful TC-12. Rugged C-frame resists distortion . . ."deep-anchored" lugs can't bend or smash. Screw-type thrust arms simplify moldboard tilting.

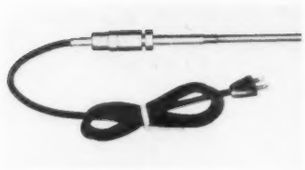
Contractor Lynn Ankrom of Decatur, Illinois, shown above, has dug over 55,000 feet of ditch with his Buckeye 308 with "no major repairs and no downtime to speak of at all!" Dependable production like this is one of the reasons why "Buckeye" has become the most famous name in ditchers.

GAR WOOD

PLANTS IN WAYNE AND

CONTRACTORS AND ENGINEERS

Cold weather starting assured with preheater

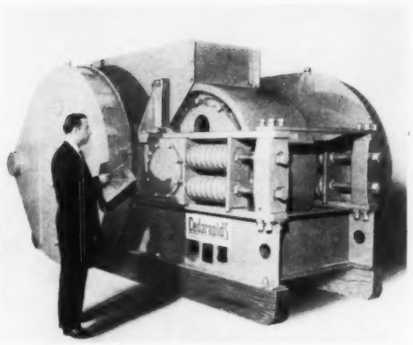


■ Efficient heat transfer for easy cold weather starting is said to be assured by the Zero-Start coolant immersion (headbolt) engine preheater available from Phillips Mfg. Co., Inc. The all-metal heater is said to eliminate the breaking and cracking that may result from plastic and fiber parts.

A patented expansion jack feature strengthens the nickel-plated steel bolt. Permanently attached by a moisture-proof and wear-resistant crimping, a 4½-foot watertight rubber cord eliminates exposed prongs.

The 650-watt preheater incorporates a cartridge-type nickel-chrome resistance wire element and high-temp fiberglass sleeving with ceramic insulation for added dialectric strength on internal lead wires. A non-coated burnished brass sheath assures efficient heat transfer to the engine coolant, while silver brazing on all seams and joints provides absolute protection against moisture.

For further information write to Phillips Mfg. Co., Inc., Dept. KP, 2816 Aldrich Ave. S., Minneapolis 8, Minn., or use the Request Card at page 18. Circle No. 94.



The Cedarapids Model 5530 roller bearing roll crusher has a capacity of up to 520 tph, depending on the size of the finished product desired and the characteristics of the material.

Roller-bearing crusher measures 55 × 30 inches

■ A new 55 × 30-inch roller-bearing roll crusher that can be used for any secondary crushing operation where an ordinary roll crusher could be used is announced by the Iowa Mfg. Co. The Cedarapids Model 5530 crusher has a capacity of up to 520 tph, depending on the size of the finished product desired and the characteristics of the material.

The large diameter of the rolls makes it possible to handle an exceptionally large feed. Maximum finished size is 5 inches and the minimum size is ¼ inch. Large shafts and Timken tapered roller bearings are said to provide long wear and economical operation.

The Model 5530 can be equipped with two smooth roll shells, two corrugated ones, or one of each, depending upon the operating requirements. Safety shear plates protect the crusher against tramp iron or uncrushable material. The opening between the rolls is adjusted by inserting or removing shims in a slot on top of the frame.

For further information write to the Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa, or use the Request Card at page 18. Circle No. 101.

Bar cutters and benders

■ The company's line of bar cutters and bar benders is outlined in a leaflet from the Farrell-Cheek Steel Co. The leaflet covers the senior and junior models of both tools. The larger bar bender can handle any rod up to 1¼ inches square or round and any flat up to ⅝ x 2 inches. The senior bar cutter will cut bars up to 1 inch square or round and any flat stock up to ⅜ x 2 inches.

To obtain this leaflet write to the Farrel-Check Steel Co., Sandusky, Ohio, or use the Request Card at page 18. Circle No. 62.

Core-drilling machine

■ A brochure covering Sprague & Henwood's Model 30 core-drilling machine is available from the manufacturer. The brochure describes and illustrates the machine's features, contains complete specifications, and details the types of mountings that are available. The Model 30 is available for skid, wheel or truck mounting.

To obtain Bulletin No. 350 write to Sprague & Henwood, Inc., 221 W. Olive, Scranton 2, Pa., or use the Request Card at page 18. Circle No. 31.

ey on maintenance when you go Gar Wood-Buckeye

Today's construction proves low input just as important as high output. You can depend on both when you go Gar Wood-Buckeye! With Buckeye ditchers you put in far less time and money on maintenance for the high output these machines deliver. Here's why:

First, Buckeyes are designed to *stand up longer.* Truss-type frame and massive, tractor-type crawlers resist even the heaviest shocks. More anti-friction bearings, fewer moving parts, and oil-bath lubrication of gears add up to long unit life!

Buckeyes also save money by being *easier to maintain.* Unit construction permits servicing without disturbing other components. Major assemblies and parts are interchangeable, cost less, and are readily available. Contact your Gar Wood-Buckeye dealer for additional facts, or write direct to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.

Gar Wood - St. Paul dump bodies and hoists are easy to maintain. Servicing can be carried out by regular mechanics working with ordinary truck tools. "Strong-Arm" hoist design eliminates one-sided dumping strain.

In the Gar Wood 75B, heavy-duty, conical-hook double rollers eliminate pin strain and rocking under load. Massive crawlers are built to take it. Compact design of the machinery deck makes parts easily accessible for servicing.

D INDUSTRIES, INC. Wayne, Michigan

YPSILANTI, MICH.; FINDLAY, OHIO; MATTOON, Ill.; RICHMOND, CALIF.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 227

Plastic foam: new material for road joints

The new joint-forming method, used on 150 miles of Michigan Highway last year, starts on U. S. 127 between Mason and Leslie. As the Flex-Plane longitudinal float passes, a T-shaped metal bar with 2½-inch vertical leg forms a groove in the slab.

Easily used material forms joints in concrete at low cost; results of Michigan highway tests lead to inclusion in spex

A plastic material, widely used for toys, refrigerator parts, wall tile, houseware items, and even bases for floral arrangements, has made a place for itself in the road-building field. This is Stryofoam, a lightweight rigid plastic produced when polystyrene is expanded about 40 times.

This material is now providing road contractors with a new way of forming transverse contraction joints in portland-cement concrete pavement. Now included in the Michigan State Highway Department's Standard Specifications, the novel technique is the result of tests carried out during the 1955 and 1956 construction seasons by the department's Construction Division.

The method

Joint forming with Styrofoam starts just after the longitudinal float passes. Then, ½ x 2-inch strips of Styrofoam are inserted into a groove formed every 99 feet in the slab with a T-shaped metal bar with a 2½-inch vertical leg. The Styrofoam is placed just before hand finishing operations begin.

As soon as the plastic has been set in a groove, the concrete is worked smooth by 5-foot floats and 10-foot straightedges. The Styrofoam in the joint not only forms the groove but also acts as a temporary filler that prevents foreign material from getting into the joint before sealing work starts. Hand tools are used to remove the Styrofoam, and joints are sand-blasted before being sealed. These last operations are done once the concrete has set—and at the convenience of the contractor.

The results

Last year, some 150 miles of concrete pavement were constructed in Michigan by contractors using Styrofoam to form joints. Results have varied from job to job, but in general, there is a two to one improvement in the riding quality of joints formed with the plastic technique. The method also gives contractors two big advantages—it keeps the cost of forming joints low and it speeds the job of constructing contraction joints. Apart from these advantages for the contractor, the material, which keeps a joint free of debris and simplifies the sealing job, provides a joint less subject to spalling.

The plastic

Lightweight, rigid, and white in color, Styrofoam is produced by The Dow Chemical Co., Midland, Mich., by expanding polystyrene plastic about 40 times to produce a plastic consisting of millions of tiny, sealed cells. These cells give the material excellent thermal insulating properties and resistance to water. And

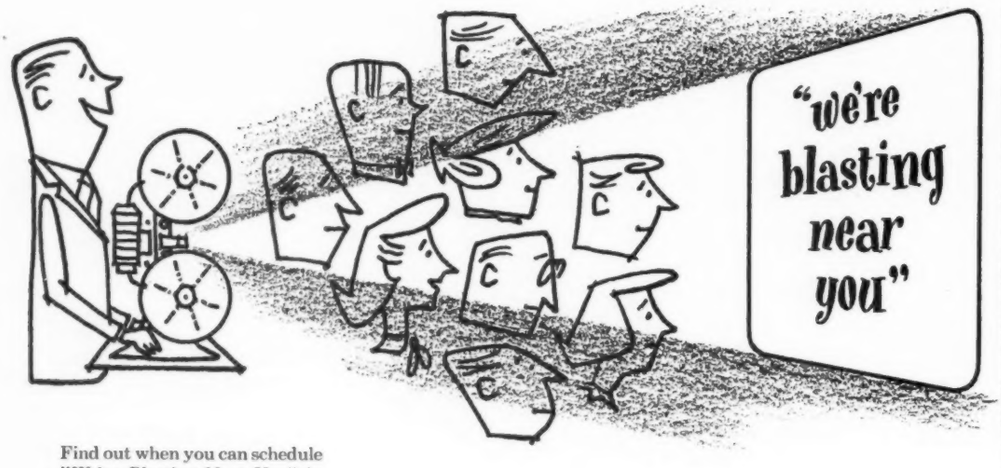
Here's a new, effective way to aid your public relations in the communities where you are blasting. It's the interesting, informative sound film in color, entitled, "*We're Blasting Near You.*"

This movie tells why blasting is necessary, and the steps you are taking to be a "good neighbor." It shows how millisecond delay techniques eliminate the old fashioned, jarring explosions of the past . . . how modern blasting methods hold noise to a muffled minimum and make vibration unnoticeable.

"*We're Blasting Near You*" can be shown to any age group: schools, service clubs, civic organizations. It is accompanied by a kit which includes suggested news releases, a sample introductory speech for the person presenting it as well as safety posters, and other helpful material. Show this unique new movie in your area. It can be an important help to you.

New film...

builds goodwill for users of explosives



Find out when you can schedule "*We're Blasting Near You*" in your community. And ask for "*Better Blasting,*" the Atlas newsletter on latest methods and materials.

Technical Customer Service Section
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE
offices in principal cities

For more facts, use Reader-Reply Card opposite page 18 and circle No. 228

Strips of Styrofoam are inserted in the groove and the concrete is hand-finished.

Once concrete has set, the plastic filler material is removed with hand tools.

A Gardner-Denver compressor supplies air for sandblasting before the joints are sealed.

these properties make the plastic a good insulating material for refrigerating equipment, and virtually any building.

Styrofoam is available in boards, rough planks, and logs up to 9 feet in length, and in two forms—a standard white and a self-extinguishing type that is colored blue for identification. The standard material can also be had in red and two shades of green. Developed during World War II, the plastic was used as a buoyancy medium in U. S. Navy life rafts and other rescue equipment. Since then, research has improved the product, making it useful to a variety of industries.

The road-building field, the latest to take advantage of Styrofoam, now has a new, economical tool that will undoubtedly find a solid niche in road construction in the important years to come. THE END.

Abrasive blades

■ A revised edition of its catalog, "Abrasive Products for the Building Trade," is available from the Bay State Abrasive Products Co. The catalog describes abrasive blades for masonry, concrete, and portable saws. To speed blade selection, a table gives recommendations for the cutting of 58 different building materials in common use.

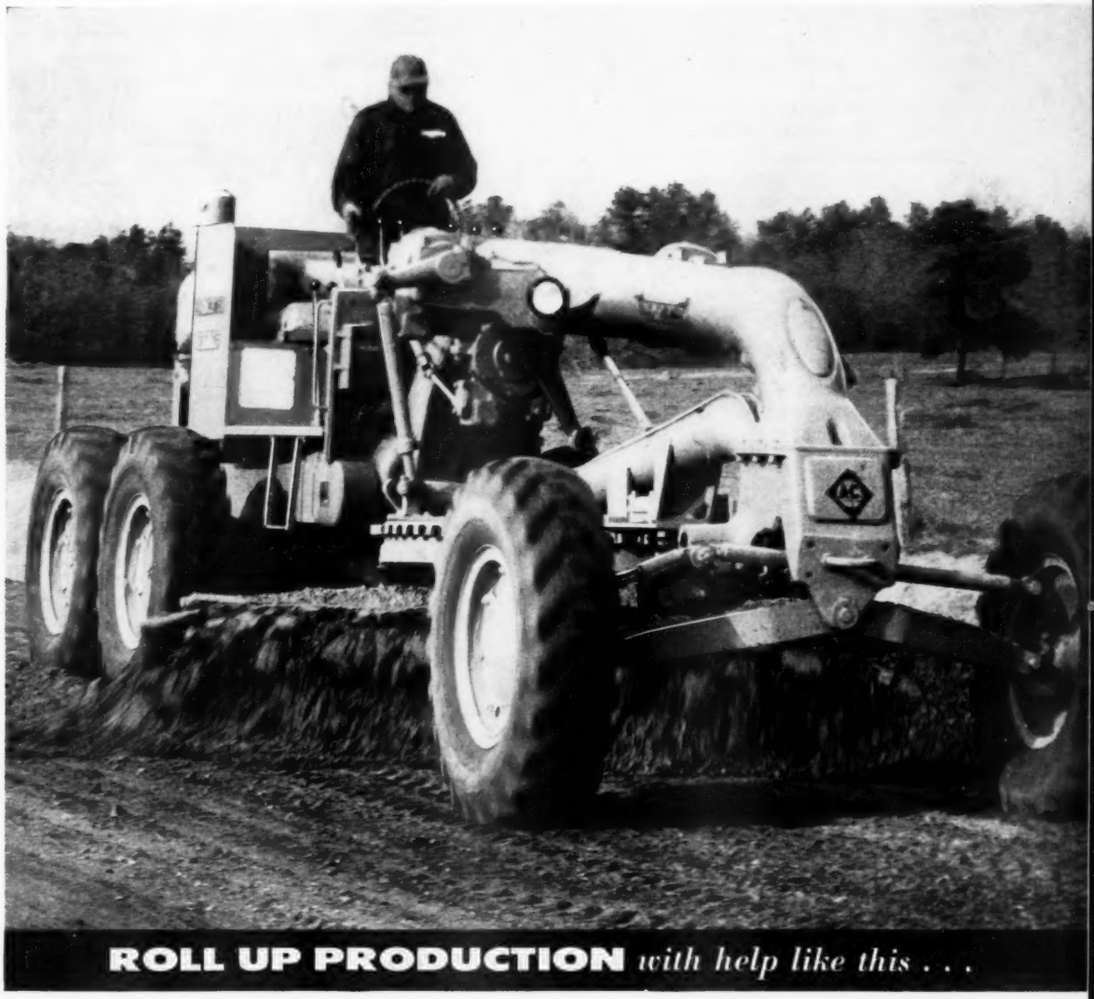
Of special interest to paving contractors is a section devoted to a pair of new reinforced blades for cutting expansion joints in green concrete. Along with a description of the blades is an illustrated presentation of the latest techniques in expansion joint cutting.

To obtain this catalog write to the Bay State Abrasive Products Co., 15 Union St., Westboro, Mass., or use the Request Card at page 18. Circle No. 60.

Road work at Table Rock

With work already started on two road jobs made necessary by the construction of Table Rock Reservoir, near Branson, Mo., plans have been made for the relocation of another road—State Highway 86 south of the reservoir. Three bridges will be located on the 13 miles of new road.

For more facts, circle No. 229→



ROLL UP PRODUCTION *with help like this . . .*

- **EXCLUSIVE "ROLL-AWAY" MOLDBOARD . . . moves tough dirt fast**
- **NEW TOGGLE-TYPE CONTROL . . . kick-free in the rough . . . pinpoint accuracy at the blue-tops**
- **HIGHEST AXLE AND THROAT CLEARANCE in its class . . . for better handling of biggest loads**
- **TOUGH TUBULAR FRAME . . . shock-absorbing strength down the middle**
- **BOX-SEAT COMFORT AND VISIBILITY . . . satisfied operators . . . more and better work done on all grading jobs**

ROLL-AWAY is an Allis-Chalmers trademark.

These are five of many reasons why Allis-Chalmers FORTY FIVE motor graders are showing up in more and more top construction organizations. They're precisely what you dirt-moving specialists ordered . . . ready now to help you handle the big road-building years ahead. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

names in the news

E. Warren Bowden, executive vice president of Walter Kidde Constructors, Inc.

Walter Kidde elects executive vice president

Recently elected executive vice president of Walter Kidde Constructors, Inc., engineering and building firm of New York, N. Y., and Houston, Texas, is E. Warren Bowden. He was formerly vice president of the firm.

Bowden, who will continue to be a director of Walter Kidde Constructors, Inc., and vice president and director of Walter Kidde Engineers-Southwest, Inc., joined the firm in 1943 as assistant to the president. Before that, he was associate engineer for the consulting firm of Parsons, Klapp, Brinckerhoff & Douglas, New York City. As assistant to the chief engineer of the Port of New York Authority, Bowden worked on such projects as the George Washington Bridge, the Lincoln Tunnel, the Triborough Bridge and the Bronx-Whitestone Bridge.

A licensed professional engineer in New York, New Jersey, Pennsylvania, Texas, Louisiana, and Oklahoma, Bowden is a member of the American Society of Civil Engineers.

Weitz Co. vice president

Leonard G. Howell is the new vice-president and general manager of the Weitz Co., Inc., contracting and engineering firm of Des Moines, Iowa. Howell will assume duties which include the full direction of the firm's construction and engineering activities.

Formerly, Howell was city manager of Des Moines. Before that, he was city manager for Madison, Wis.; Port Huron, Mich.; and his home town of Ironton, Ohio. Howell served Ironton as city engineer for ten years and during the late '20s spent four and a half years as construction superintendent for a street and highway paving contractor. Howell is a graduate in engineering of Denison University, Granville, Ohio.

Vermont Highway Board announces two promotions

The Vermont State Highway Board has announced two promotions in the engineering staff of the state highway department. G. A. Pierce, formerly the district engineer at St. Albans, has become assistant to the chief engineer, while B. M. Blanchard, previously an engineer in the department's construction division, has been made head of the St. Albans District.

R. O. Wilson takes Asphalt Institute Post

R. O. Wilson of Cosden Petroleum Corp., Arlington, Tex., succeeds Sidney Goldin of Shell Oil Co., N. Y. as chairman of the board of the Asphalt Institute. Five new regional vice presidents are T. F. McGarey of Cities Service Oil Co., New York, N. Y., D. H. Jenks Jr., of Ashland Oil & Refining Co., Ashland, Ky., G. L. Farnsworth, of Husky Oil Co., Cody, Wyo., C. Wayne Barbour, Allied Materials Corp., Oklahoma City, Okla., and C. V. Keefer, Shell Oil Co., San Francisco, Calif.

Five new members have joined the Institute: Atlantic Refining Co., Philadelphia, Pa.; Texas Asphalt & Refining Co., Houston, Tex.; Wilshire Oil Co. of California, Los Angeles, Calif.; Northwestern Refining Co., St. Paul, Minn.; and Big Horn Refining Co., Lovell, Wyo.

The Asphalt Institute states that it will be capable of meeting all demands for paving asphalts created by the $51 billion Federal road-building program. Goldin claims that there has been no shortage of paving asphalt to date nor is any anticipated. He adds that the industry is capable of almost doubling the present output without any expansion of existing plant facilities.

Army engineers appoint

Brigadier General Walter K. Wilson Jr. has been named Deputy Chief of Engineers of Construction, United States Army. His former position of Assistant Chief of Engineers for Construction is now occupied by Brig. General Edward A. Brown, Jr., former Acting Deputy Chief of Public Information and Deputy Chief of Information and Education, Department of Army.

Major General Charles G. Holle, former Deputy Chief of Engineers for Construction, has become Special Assistant to the Chief of Engineers, a newly created post. He will serve as permanent Chairman of the Board of Engineers for Rivers and Harbors; alternate to the Secretary of the Army on the St. Lawrence River Joint Board of Engineers, and representative of the Chief of Engineers on matters relating to the St. Lawrence Seaway.

Tuffy® Wire Rope Tips

Until recently, a relatively meager amount of factual data has been available for estimating life expectancy of wire rope. Predicting how much service life could be expected from a given wire rope construction under a given set of operating conditions was largely a matter of guess-work, trial-and-error and generally inexact calculations.

Since bending stresses are a major factor in wire rope life, Union Wire Rope engineers designed the Accelerated Fatigue Tester, shown above, with which to pin down the effects of bending on wire rope. Now, from a long and exhaustive series of bending tests, scientific data has been accumulated and organized to take the place of former rule-of-thumb methods.

The data established by this laboratory research is based on the effect of various sheave diameters on bending stresses of various constructions of wire rope.

From test data, bending-life curves have been plotted by Union Wire Rope engineers for each of the more widely used rope constructions. Analysis made on each of these curves showed them to follow a pattern expressed by the curve shown in Fig. 1.

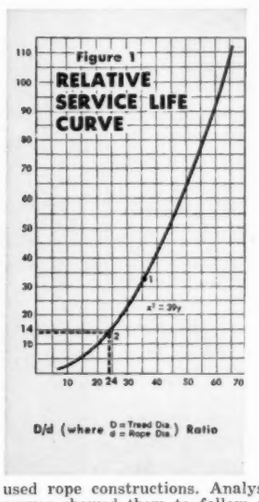


Table 2
BENDING-LIFE FACTORS
When Using Curve of 6x37 IPS

CONSTRUCTION	FACTOR
6x7	0.57
18x7	0.67
6x17 Seale	0.71
6x19 Seale	0.88
6x21 Filler Wire	0.92
6x25 Filler Wire	1.06
6x31	1.08
8x19 Seale	1.14
6x37	1.33
8x19 Warrington	1.22
Tiller Rope	2.58

Table 3
SHEAVE DIAMETER FACTORS

ROPE CONSTRUCTION	GENERAL PURPOSE RANGE D/d Ratios When D = Tread Dia, d = Rope Dia
6x7	63
18x7	54
6x17 Seale	49
6x19 Seale	45
6x21 Filler Wire	39
6x25 Filler Wire	36
6x31	33
8x19 Seale	31
6x37	27
8x19 Warrington	27
Tiller Rope	18

Note on Fig. 1 the curve shows that as the ratio of tread diameter to rope diameter increases (see D/d figures at bottom of chart) the longer the relative service life as expressed by the figures at the left of the chart.

However, there are few pieces of equipment on which sheave and drum sizes can be large enough to afford D/d ratios above 50. From test data the general-purpose range of D/d ratios was determined. Those recommended are set up in Table 3.

Spotted on the curve, for example, is the D/d ratio of 24 at point 1 and D/d ratio of 36 at point 2—these being the ranges for general purposes taken from Table 3 for the 6x25 filler

Tuffy Special Wire Ropes are tailored to special use. Ordering is easy—just say

Tuffy Scraper Rope

Moves more yardage per foot because **Tuffy** Scraper Rope is specially built to take the beating of extreme drum-crushing abuse. Flexible; withstands sharp bending; hugs sheave grooves and winds snugly and smoothly on drums. High resistance to load shock on slack line.

Tuffy Dragline Rope

Longer-wearing line for all dragline operations. Special abrasion resisting construction which also gives extra flexibility. Tuffy Draglines also spool better, ride better on grooves and hold tightly to drums when casting. Consistently dependable in handling any material—wet or dry dirt, sand, gravel, rock, cement or minerals.

James D. McKinney, Pittsburgh district office general manager for Intrusion-Prepakt.

Intrusion-Prepakt names district office manager

The new general manager of the Pittsburgh district office of Intrusion-Prepakt, Inc., Cleveland, Ohio, is James D. McKinney. With Intrusion-Prepakt since 1954, principally as superintendent engineer for Prepakt concrete placement, McKinney's assignments have included such projects as Garrison Dam, Mackinac Bridge, and Tarrytown Bridge.

McKinney, who was an instructor in map reading and surveying with the Second Army during World War II, has also done design work for diversified municipal projects, dams, water distribution systems, and a water treatment plant. He has also worked on engineering projects in Alaska, Iceland, Cuba, and Turkey.

Raymond Concrete Pile elects Moss a director

Raymond Concrete Pile Co., of New York, N. Y., has announced the election of D. W. Moss as a director of the firm, succeeding Rear Adm. Kirby Smith CEC, USN (Ret.), who has resigned.

Moss, who has been with Raymond since 1936, succeeded Smith as vice president in charge of domestic sales in 1953. Smith has been associated with the firm since 1926, except for a period of Navy service during World War II.

Carl A. Morse heads Diesel Construction

Carl A. Morse has succeeded Erwin S. Wolfson as president of Diesel Construction Co., Inc., New York, N. Y., which currently has more than $100 million worth of skyscraper construction under contract. Wolfson has been made chairman of the board.

In a major realignment of executive officers of the company, Paul Cone has been made vice president of Diesel Construction, and William Zimmerman and Theodore G. Kirschner have been made executive vice president and vice president respectively, of the Wolfson Management Corp., Diesel Construction's associated real estate division.

Morse, who had been vice president of Diesel Construction since joining the firm in 1952, will direct all the construction and general contracting functions of the company.

Kreger elected head of Wayne County Board

The Wayne County, Michigan, Board of Road Commissioners has elected commissioner William E. Kreger as chairman for 1957, the fifty-first year of the board's operation.

A former mayor of Wyandotte, Mich., Kreger also served five years as a member of Wayne County's Board of Supervisors, during which time he served as chairman of the Out-County Supervisors, chairman of the Capital Improvement Program Committee and a member of the Ways and Means Committee, the the Civil Service Committee, and the Port Committee.

A member of the Board of Wayne County Road Commissioners since 1955, Kreger's job as head of the board will involve work connected wth completing the John C. Lodge and Edsel B. Ford expressways, the planning of four proposed expressways, and construction and maintenance of streets and highways. The board is also concerned with developing and maintaining parks, sewage disposal systems, and water plants, as well as airport facilities.

AGC national staff makes changes

The national staff of the Associated General Contractors of America has made several changes: James M. Sprouse has been named manager of the Highway Contractors' Division; Francis E. Twiss is the new engineer advisor; and Donald A. Buzzell, the assistant manager of the Heavy Construction and Railroad Contractors' Division, has undertaken new responsibilities.

With the staff since 1957, Sprouse was formerly manager of the Heavy Construction and Railroad Contractors' Division.

Twiss is now acting as secretary for the AGC Education Committee, co-secretary of the joint committees of the American Society of Civil Engineers and American Society for Engineering Education.

Buzzell has been a member of the AGC staff since 1953, assisting in the Heavy Construction and Railroad Contractors' Division.

Archie N. Carter, former manager of the Highway Contractors' Division, has resigned in order to form the firm of Lindsey Carter & Associates, Consulting Engineers and Land Surveyors, Excelsior, Minn., together with James A. Lindsey, Jr., of Lindsey Engineering Co.

How to predetermine wire rope life

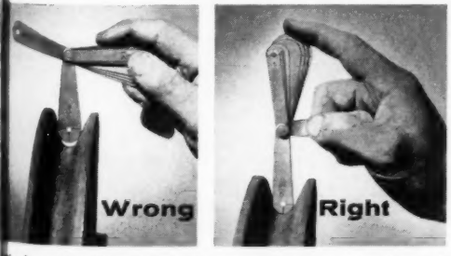
Here's the easier, surer way developed by Union Wire Rope Corporation Engineers

ope. Moving from these points to the left on the chart, the lative service life of this rope ranges from 14 to 34 units any service measure used, such as yards, tons, days, etc.

ow to determine the relative service life of say a 6x37. s bending life factor (see Table 2) is 1.33 as compared to 00 for the 6x25 filler wire. Multiply the service life readgs of 14 and 25 for the 6x25 filler wire by 1.33, and we find e service life range of the 6x37 falls at 18 and 27 units of rvice. Relative service life of other ropes are determined the same way by using the bending factor indicated for ch as the multiplier.

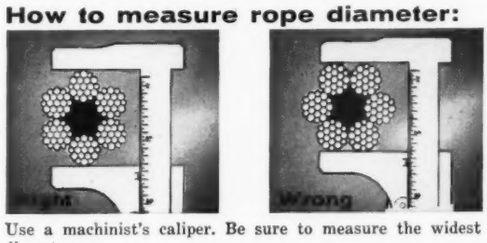
f course bending is not the only wear factor in wire rope eration, and the general rule—that more flexible ropes ould be used as bending stress increases with decrease in ameter of sheave or drum—has to be modified in field e. In fact there are eight other principal operating conitions, in addition to bending stresses, that affect wire pe service life. They are loading conditions, portability, rrosion, abrasion, rope speeds, materials handled, and uipment design.

What Size Rope?



Check groove diameter: When new wire rope is to be used old equipment, make sure the tread or bearing surface all sheaves is of sufficient groove diameter to avoid nching the rope.

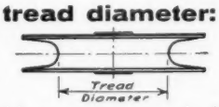
How to measure rope diameter:



Use a machinist's caliper. Be sure to measure the widest diameter.

How to measure tread diameter:

Select the smallest sheave or drum to be used with the new wire rope, and measure actual diameter of tread.



Sheaves with grooves corrugated with rope lay impression should be replaced with new ones before installing new wire rope.

New wire ropes are usually over-size. It is advisable to have groove diameters of sheaves or drums as large as the actual calipered diameter of the new rope, or slightly larger. We recommend sizes as follows:

Diameter of Rope	Groove Diameters	
	Minimum	Maximum
½" and smaller	diameter + 1/32"	diameter + 3/32"
9/16-1"	diameter + 1/16"	diameter + 1/8"
1-1/16-2"	diameter + 3/32"	diameter + 3/16"
Over 2"	diameter + 1/8"	diameter + 1/4"

Following the above instructions, you will know the Diameter of Wire Rope to use to fit your equipment.

Just say **Tuffy** give length and size, and forget complicated specifications.

Tuffy Slings and Hoist Lines

re's a team that cuts hoisting and wn-time costs in all types of materials ndling.

Tuffy Slings are made of a patented, achine-braided fabric that stays extra ong, and isn't materially damaged knotting or kinking.

Tuffy Hoist Line is a special construcn with the extra flexibility and toughss for longer service life on overhead, ff leg and mobile cranes, derricks and ramshells.

Tuffy Dozer Rope

ng after ordinary ropes are worn out, ffy Dozer Rope has the stamina it kes to keep on handling the blade. 150' ths of 1/2" or 9/16" mounted on your ppers let you cut off worn sections with- wasting good rope. This unbeatable mbination piles up sizeable savings on zer rope costs.

Your Tuffy Distributor is ready to help you with any wire rope problem.

If you aren't acquainted with him, look under "Wire Rope" or "Slings" in the classified pages of your telephone directory.

FREE! New "Rope Dope" Educational Bulletins

They're packed with boiled-down, useful information on the selection and care of wire rope for greatest service. Just ask your Tuffy Distributor to put your name on his mailing list.

union Wire Rope **corp.**

2260 Manchester Avenue, Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

For more facts, use Reader-Reply Card opposite page 18 and circle No. 230

Fair play helps divide responsibility for damage in construction contract

by MAX ROBERT SCHRAYER, C.P.C.U.

Those who prepare contracts have been lax in clearly setting forth the terms and conditions of the contract with respect to damage to or loss of the materials that go into a building project.

Owners usually assume that the contractor is expected to build the project and deliver it to the owner when it is completed. If any losses occur during the period of construction, the owner usually believes that the contractor will, at his own expense, make good the loss, replace the material, and do the work again. Owners argue that they are paying for a completed job and expected it to be delivered, completely finished, before the contractor's responsibility ends.

Contractors, on the other hand, are often unaware of this responsibility and take for granted that their obligation is to obtain the proper materials and provide the necessary labor and supervision. When materials are permanently in place in the structure, these contractors believe that their responsibility terminates.

Contractors and owners may agree upon any kind of arrangement that both think fair and reasonable as long as there has been a meeting of the minds. When the decisions have been reduced to writing and made a part of the contract, it becomes a simple matter to determine upon whose shoulders a loss will fall. Lawyers and architects who prepare such contracts often overlook the need for a clear-cut understanding and, therefore, disputes and disagreements arise which lead to unsatisfactory relations between contractors and their customers.

Two important factors

Two factors should be given serious consideration when a contract is planned. The first is the matter of reasonableness and fair play. The contractor should certainly assume responsibility for properly supervising the job and for any losses which occur because of his negligence. The owner entrusts the project to the contractor and has a right to expect the contractor to assume these responsibilities.

The second consideration is insurance. An understanding of what can be insured will help in preparing a satisfactory contract. Too often, either the owner or the contractor accepts responsibility for hazards and risks which cannot be insured. There are some risks that must be described as business risks and these must be self-insured. The owner and the contractor should understand what these

Drawing shows the enormous potential of the Essick Model VR 54 T as used in triplex by S. J. Groves Company compacting runways at Lakehurst Naval Air Station.

When specs are made quickly and economically, and compaction is "in place, at density," you'll probably find that the job was done with an Essick—the vibrating roller that's proved itself **in the field,** where **results** count. Contractor's using the Essick Model VR-54-T find that this dynamic compactor is designed to work in the most confined areas, being easily backed or towed by the lightest tractor. 4 to 6 single passes with an Essick will compact 21" of granular material to the most rigid specifications.

If you're looking for compaction **plus** profit, you'll find that the Essick Model VR-54-T has an amazingly low first cost, a low operating cost, and can actually save **two-thirds** on spreading and rolling operations.

—and for sheer power and ability, the Model VR-54-T is used in both tandem and triplex hook-ups for the most potent package of compaction tools available today.

ESSICK MANUFACTURING COMPANY
1950 SANTA FE AVE., LOS ANGELES 21, CALIF.
850 WOODRUFF LANE, ELIZABETH, NEW JERSEY

ESSICK®

AFFILIATED WITH THE T. L. SMITH COMPANY, MILWAUKEE, WISC.
For more facts, use Reader-Reply Card opposite page 18 and circle No. 231

This is the third of a series of articles on insurance and construction contracts by Max Robert Schrayer, vice president of Associated Agencies, Inc., Chicago, Ill. Mr. Schrayer, a graduate mechanical engineer from the University of Michigan, is a Chartered Property and Casualty Underwriter and a member of the Board of Trustees of Roosevelt University of Chicago. The object of this series is to help the contractor and owner draw up a clear and well defined construction contract involving insurance.

risks are and know in advance which one is to bear the responsibility for each such hazard.

Natural hazards

Fire insurance companies will insure against many of the natural hazards. Loss by fire, lightning, windstorm, tornado, or explosion are very easily insured. The standard fire insurance contracts, with the extended coverage endorsement, will cover damage done to property as a result of a motor vehicle or an airplane accident, loss occasioned by riot or civil commotion, or vandalism or malicious mischief. Since these hazards are easily insured and very often a mortgage is involved in a construction project, it has become standard procedure for the owner to be insured against them. The mortgage company provides the money for the loan, and to the contractor for any materials that are on the site waiting to be installed or are already in the project. Only the contractor's own personal equipment is omitted from this type of insurance policy.

There are other natural hazards that are either uninsurable or difficult to insure, and these should be specifically listed and a decision made as to who is responsible. Loss from an earthquake is insurable, but in some communities the chance of an earthquake is extremely unlikely. Either it should be understood that earthquake damage is to be covered by insurance or the owner should understand that the risk is his.

Loss by water due to flood or the breaking of pipes can be insured in some communities. Flood, or loss due to the rising of surface waters are almost always uninsurable if the community is in a location where losses of this nature are likely. If no insurance can be purchased, the owner must accept this responsibility. If the location is such that there is no need for this type of insurance, then the owner should expressly state that the contractor is to be relieved of this responsibility. Responsibility for water damage caused by sewers or pipes breaking should be assumed by the contractor, who can obtain insurance against such damage. If the project is such that insurance is unavailable, the contractor must refuse to accept responsibility and insist that the owner bear the risk.

New hazard

Atomic fission is a new hazard and loss from it is difficult to cover and almost always uninsurable. Because of the tremendous amount of damage that can be done, however, there should be an understanding between the owner and the contractor as to who will be responsible if a loss occurs from this source. Usually the contractor is in no position to protect himself against such a loss, and the owner must stand the responsibility. This fact should be clearly defined in the contract.

Finally, the collapse of the building should be discussed in the contract. If the collapse occurs as a result of faulty construction, responsibility must be placed on the contractor. If the collapse occurs through one of the other hazards mentioned, the owner may be responsible.

The important thing is that all of these types of hazards should be specifically mentioned. The use of such general terms as "catastrophe" should be avoided because of the indefiniteness of the term and the inability to insure.

Theft

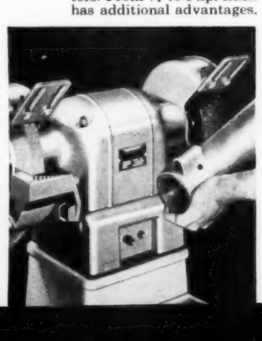
Much more confusing is the problem of burglary, theft, robbery, or holdup. Very few contracts even mention this possibility although there are many jobs on which losses

Four models...one tailor-made for your work!

PUSH-BUTTON SAFETY SWITCH! 2 pole push-button switch is recessed for your protection, but is easily accessible.

ADJUSTABLE U-SHAPED TOOL REST: Gives full support. Can be adjusted for wheel wear. Perforations stop dirt accumulation.

4 VERSATILE MODELS, 4 POWERFUL MOTORS! 6" through 10" wheel diameters. From ¼ to 1 hp. Each has additional advantages.



DRILLS

VACUUM CLEANERS

SANDERS

HAMMERS

Look Under "TOOLS-ELECTRIC" in Yellow Pages

Smooth-running Black & Decker Bench Grinders are POWER-BUILT for continuous peak performance!

Choose one of the four Black & Decker Bench Grinders and you're sure to get top quality tool sharpening, wire brushing, grinding, buffing.

The smooth-running Black & Decker-built motor is designed to give constant speed, regardless of load. Extends life of wheel, causes less overheating. Lubricant-sealed ball bearings protect against abrasive damage. Adjustable tool rests, adjustable spark shields, and built-in exhaust outlets make for safer, easier operation.

Call your distributor for a free demonstration today. For a free catalog write to: THE BLACK & DECKER MFG. Co., Dept. 7902, Towson 4, Md. (In Canada: 80-86 Fleet St., E., Toronto 2, Ont.)

Leading Distributors Everywhere Sell

B&D Black & Decker®

Portable Electric Tools—Power-Built to Last

For more facts, circle No. 232→

of this nature occur. More often than not the contractors are called upon to make good even though the loss has not been the result of their negligence.

There is a great deal of uncertainty as to just what the law is with regard to the responsibility for loss by theft. If the contract distinctly points out the areas of responsibility, disputes can be eliminated. The point that generally causes misunderstanding is the ownership of the material at the time of loss.

As a general legal proposition, the property interests or title to building materials or equipment usually remain with the contractor or subcontractor until the material or equipment has actually been installed in the building. This means that, unless otherwise provided in the contract, if theft occurs before the property is attached to the building the contractor is held liable.

Boilers or pieces of equipment used with heating or ventilating units are often installed in a building months before the structure is completed and turned over to the owner. In this case, the subcontractor has completed his part of the work and, unless otherwise provided, made a constructive delivery to the owner. If the equipment is stolen, the owner could probably be held responsible, even though he had no way of protecting himself.

It would seem to be more practical from all points of view to expect the general contractor to be responsible for all of the material and equipment that goes into a building until the structure is delivered to the owner. The contractor would then have the responsibility of protecting the property by providing watchmen and, no doubt, by obtaining insurance. The cost of the insurance is eventually paid by the owner as part of the construction cost, but the contractor takes the responsibility in the event of loss.

One of the most troublesome minor problems is caused by plate glass. It is often assumed that plate glass is insured by the owner as soon as it has been installed in a building, relieving the contractor of the responsibility of protecting the glass. From a practical standpoint, this is impossible. Insurance companies will not insure glass installed in an unfinished building because of the hazards that exist during construction. Often, the owner is expected to be responsible, although he is unable to protect the glass in any way. If it is definitely stated in the contract that the general contractor is responsible for the plate glass until the building is actually delivered to the owner, the construction program can be arranged in such a manner that the glass will be put in at the latest possible date. Most of the workmen will not be on the site at this time, and the chances of loss are at a minimum.

Insurance is obtainable for most of these hazards. Competent insurance men can advise both owners and contractors as to what is obtainable. Advance arrangements can be made with both parties so that they can accept the necessary responsibility and purchase insurance. The cost can be borne by the owner as part of the cost of construction, but both the owner and the contractor will understand the responsibilities which each has accepted.

(To be continued)

Reinforced-concrete design treated in new volume

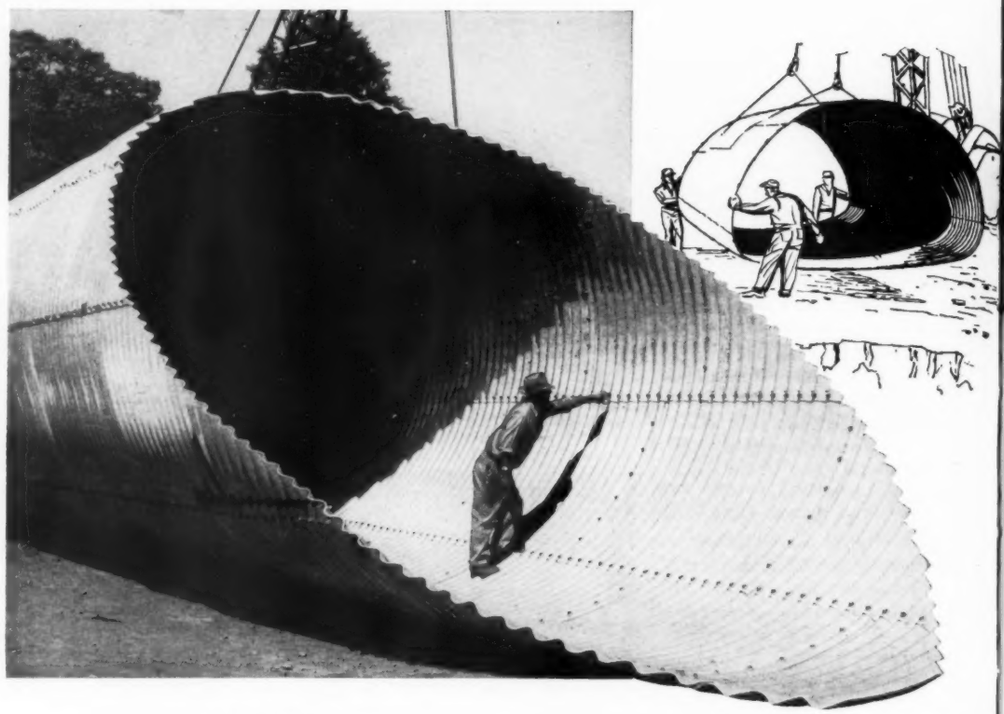
"Structures" is the title of a new book on reinforced-concrete design and construction written by Pier Luigi Nervi, head of the firm Ingg. Nervi e Bartoli, in Rome and professor of Structural Design at the School of Architecture of the University of Rome. In the slim volume, Nervi discusses in clear and simple language, his ideas, hopes, and even his mistakes in 30 years of building. Among the chapters is one on Ferrocemento, a reinforced-concrete in an entirely new concept that combines concrete's freedom of form with steel's quality of strength. Nervi, who originated the use of Ferro-cemento, has used the material in some of the largest thin-shell concrete structures in the world, including the Turin Exhibition Building, a Naval Academy building at Leghorn, and the Milan fair building. These are shown in photographs and drawings.

Nervi's book covers such topics as building correctly, structural characteristics of reinforced concrete, the imperfect elastic behavior of concrete, structural prefabrication, ex-

For Permanence, Economy, and

TWO USS PRODUCTS FOR

LARGE OR



USS AMBRIDGE SECTIONAL PLATE

PIPE · PIPE-ARCH · ARCH

USS AMBRIDGE Sectional Plate Pipe, Pipe-Arches and Arches are available in a *complete range* of standard sizes to satisfy design requirements for any waterway opening. These flexible structures, with their 6″ x 2″ corrugations, can resist extremely large externally applied loads.

Special details such as asphalt coating, hook bolts, beveled ends, and skewed ends are furnished as specified for each job. These structures are economical, permanent, and go in quickly with minimum traffic interruption.

SEND FOR NEW CATALOG

Containing complete information on AMBRIDGE Sectional Plate, our new 28-page catalog covers such details as design, sizes, weights, gages, and assembly instructions. For your free copy, just send your request to American Bridge Division, U. S. Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

USS

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

UNITED STATES STEEL

perimental model analysis and structural freedom and the future.

Copies of "Structures" may be had, at $6.95 each, from the publisher, Dodge Books, 119 W. 40th St., New York 18, N. Y.

Sewage treatment book now in second edition

The second edition of "Sewage Treatment" has been entirely rewritten to include all the most recent developments in the field. Some of the many new processes discussed are step aeration of distributed loading in the activated-sludge process, and continuous loading and unloading of sludge digesters with thickened sludge.

As in the previous edition, the use of calculus and elaborate drawings have been eliminated in favor of simple arithmetical outlines of structures and mechanisms. This edition too is concerned with the requirements and practices of North American municipalties and industries.

The book, published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., can be ordered from the publisher at $7.50 per copy.

The Blackhawk Model S-140 pipe bender, shown with a Model P-182 electrically driven hydraulic pump, is one of four new models announced by the manufacturer.

Four new models added to line of pipe benders

■ Several new 3 and 4-inch hydraulic pipe and conduit benders have been added to the line available from the Blackhawk Mfg. Co. The Models S-137, S-138, S-139, and S-140 are all equipped with Blackhawk's patented Optik-Angle gage, which eliminates guesswork in bending to the proper degree.

The Blackhawk line now includes units to bend pipe and rigid conduit from ½ through 4 inches in diameter. A 90-degree bend can be made with one stroke of the ram in pipe through 3 inches in diameter, and with only three setups in 4-inch pipe.

All models are constructed of rigid, lightweight aluminum and have removable top plates for easy pipe positioning. They will work in any position, even overhead. Newly designed rams have long-stroke plungers. The 4-inch bender has a 13-inch ram stroke. The 3-inch models have 10-inch strokes.

For further information write to the Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 46, Wis., or use the Request Card at page 18. Circle No. 64.

Tandem-axle units

■ Tandem-axle truck and trailer units requiring no lubrication of the tandem assemblies are described in literature from the Hendrickson Mfg. Co. Lubrication has been eliminated by the use of four rubber load cushions and complete rubber bushing of all oscillating points.

Automatic alignment of the tandem axles to each other and to the frame, due to the compression and reflex action of the rubber, is described and explained in the literature. The load cushion innovation in tandem suspension is also detailed. Drawings and diagrams illustrate the special features.

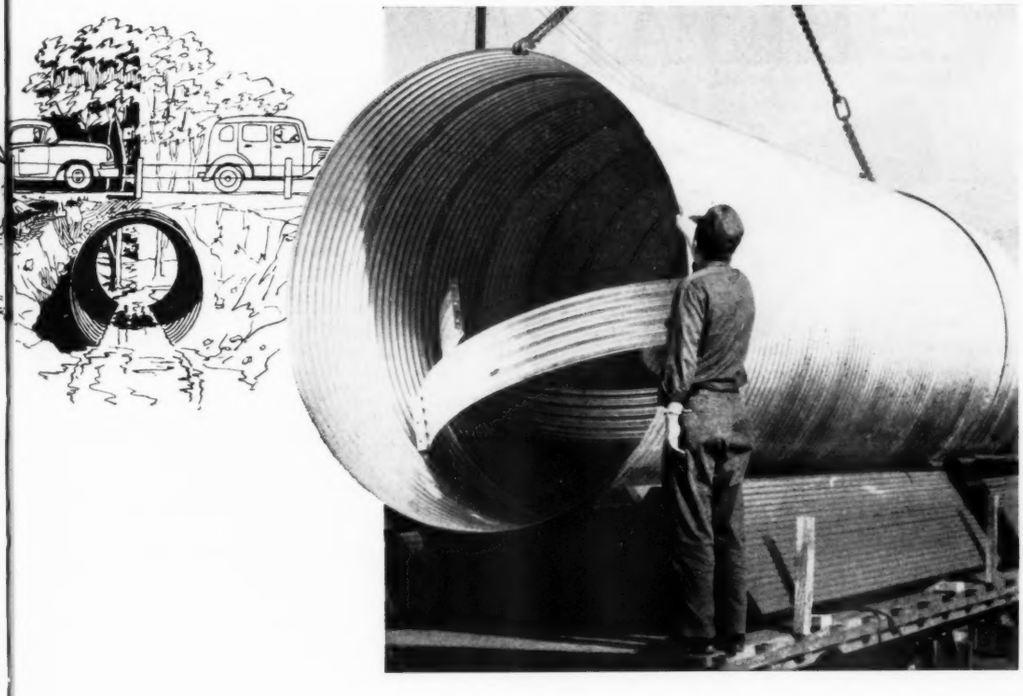
To obtain this literature write to Hendrickson Mfg. Co., 8001 W. 47th St., Lyons, Ill., or use the Request Card at page 18. Circle No. 37.

Firm handles export of cement intensifier

Insuro Chemical Co., Inc., West Upton, Mass., has placed Kinmar Export & Import Co., 580 Fifth Ave., New York, N. Y., in charge of handling the export of Insuro, an emulsion cement intensifier that gives high early strength to concrete.

Speed of Installation

DRAINAGE STRUCTURES SMALL



USS GALVANIZED CULVERT SHEETS

Culverts made from USS Galvanized Corrugated Culvert Sheets provide a lasting economical means of handling drainage problems. They will carry more load than rigid-type structures, and readily absorb the forces of impact and vibration.

These advantages, plus the fact that metal culverts are not subject to breakage, require no maintenance, cost less to install and are easy to ship and handle, make them ideal for most drainage purposes.

NEW CATALOG AVAILABLE SOON. We are completing a new catalog on USS Culvert Sheets for Metal Drainage Products. Covers design, sizes and weights, gages, installation and other engineering details. For free copy, send your request to United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH, PA. • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

7-455

UNITED STATES STEEL

←For more facts, circle No. 233

avoid legal pitfalls

Edited by A. L. H. STREET
Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Subcontractor had right to cancel erroneous bid

THE PROBLEM: *A public building contractor received four bids to furnish structural steel; the defendant's bid of $37,700, excluding decking; another bid of $39,880, excluding decking; a $51,778 bid including decking; and a $9,300 bid for decking alone. Inadvertently, the defendant's representative confirmed its telephoned bid as including decking, and the general contractor secured the defendant's signature to a subcontract calling for $37,700, including decking. Four days later the mistake was discovered by the defendant but the general contractor refused to assent to a correction. The subcontract was reawarded to a third party at $49,000, and the general contractor sued defendant for $11,300, the difference between the two bid prices. Was the general contractor entitled to collect?*

THE ANSWER: No. (Brunzell Construction Co. v. G. J. Weisbrod, Inc., 285 Pac. 2d 989, decided by the California District Court of Appeal, Second District, Los Angeles.)

The decision rested upon a conclusion that the general contractor knew or ought to have known that inclusion of the decking item was an innocent mistake, so far as the defendant was concerned, and that the general contractor undertook to take an unfair advantage of that fact.

The Court of Appeals referred to a decision rendered by the California Supreme Court in which a municipal contractor was permitted to recall a bid because of an innocent mistake involving omission of a $307,769 item in computing a bid. (M. F. Kemper Construction Co. v. City of Los Angeles, 37 Cal. 2d 696, 235 Pac. 2d 7.) In that case promptness in seeking withdrawal of the bids and the city's knowledge that there was a mistake were factors in the court's decision. The Supreme Court recognized that such errors "will sometimes occur in the conduct of reasonable and cautious businessmen," and added that the evidence showed that "it would be unconscionable to hold the company to its bid at the mistaken figure. The city had knowledge before the bid was accepted that the company had made a clerical error which resulted in the omission of an item amounting to nearly one-third of the amount intended to be bid."

Regarding the structural steel subcontract, the Court of Appeals noted these significant facts: (1) The general contractor in submitting its own bid had listed among the subcontractors another company as subcontractor for the steel decking. (2) As an experienced bidder on public projects, the general contractor was bound to know that the defendant's bid would be "in line" with other bids only if it excluded decking.

NOW IS THE TIME TO GET THE BIG ADVANTAGES OF BRUNSON'S EXCLUSIVE BALL BEARING CONSTRUCTION...

STOPS DUST, WEAR and REPAIR!

BRUNSON INSTRUMENTS STAY ACCURATE WHERE OTHERS FAIL!

The construction boom means bigger and tougher jobs ahead. Right now is the time to replace those old, inadequate surveying instruments you've been putting up with—now's the time to get modern Brunson instruments with dustproof ball bearing construction!

Located in the spindle and telescope axis, Brunson ball bearings are permanently lubricated by an all-temperature grease and sealed against dust and moisture. Preloaded and accurate to 5-millionths of an inch, these ball bearings provide highest possible instrument accuracy. With dust sealed out and lubricant sealed in, wear is practically eliminated by the smooth ball bearing action. That's why your Brunson instrument stays accurate and operable year-in-and-year-out, where others fail. You save hundreds of hours in on-work time, avoid costly errors, slash routine repair and maintenance expense to a level undreamed of in the past.

You pay no more for Brunson's exclusive ball bearing construction. You get much more—now when you need it! Mail coupon today!

Illustrated at the left is Engineer's Transit Model 50. (All Brunson transits, levels, and transit levels have dustproof ball bearing construction.)

BRUNSON The New Standard of Excellence

Distributed Exclusively By

BRUNING

America's Leading Supplier of Engineering and Drafting Equipment
(In Canada: write 105 Church St., Toronto 1, Ont.)

Charles Bruning Company, Inc., Dept. 24-R
4700 Montrose Ave., Chicago 41, Ill.

Please send me information on Brunson Surveying instruments.

Name_____ Title_____

Company_____

Address_____

City_____ County_____ State_____

For more facts, use Reader-Reply Card opposite page 18 and circle No. 234

For more facts on insert, circle No. 235→

Contractor not liable for injuries on open road

THE PROBLEM: *A contract provided for widening and resurfacing 17 miles of state highway. The contractor was required to maintain through and local traffic during construction, to maintain bypasses in suitable condition, and to position the necessary barricades, warning signs, and watchmen. Work was in progress on only a 6-mile stretch at one end of the 17 miles. Beyond that was a section of the old highway in badly deteriorated condition which the contractor was to repair. Motorists on that section were injured, allegedly because of a hole in the old pavement. Was the contractor liable?*

THE ANSWER: No. (McClendon v. T. L. James Co., 231 Fed. 2d 802, decided by the United States Court of Appeals, Fifth Circuit.)

The court said that the contract could not reasonably require the contractor to guard against injury to motorists on a section of the project open to public travel and not under actual construction.

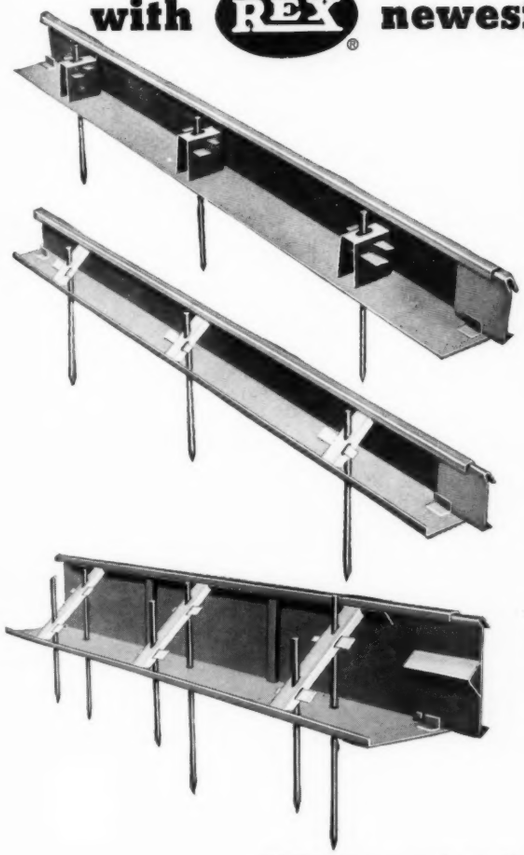
Subcontractor's indemnity agreement not applicable

THE PROBLEMS: *Plaintiff, prime contractor, sublet work to defendant, who agreed to indemnify plaintiff against liability for injury to anyone through defendant's negligence. One of the defendant's employees was injured because of a defective truck used on the job, and the employee won a damage award on the ground that the plaintiff had neglected to repair a defect which it knew existed. (1) Was defendant bound to indemnify plaintiff? (2) By an agreement*

FORM FASTER!

greater speed and ease are here now

with REX® newest designed forms



REX ROAD FORMS

Profit more from all the high-speed features of up-to-date design. Slice your forming time and costs on every job with Rex Forms. The only line of single and double wedge stake pocket forms with standard slide lock connections—*they're interchangeable!* Built stronger for today's heavier form-traveling machines with special all-welded, alloy steel construction. All needed sizes—*all* available for fastest delivery. Also specials for any particular requirements. *Check Rex first!*

REX AIRPORT FORMS

The high-strength forms with the rapid setting advantages. Rugged double stake pocket construction with perfect-fit slide locks gives better alignment. 100% welded of special alloy steel for maximum strength and rigidity...lasting durability. In the sizes you need—with the speedy delivery you want. Also new Rex Two-Way Airport Forms—with the double advantages of handling two slab thicknesses with one set of forms. *Check Rex First!*

REX is the complete Concrete Paving Line!

Cut your costs and assure best results—take advantage of the job-speeding benefits of the complete Rex Concrete Road Builders Line: Pavers... Spreaders... Finishers... Float Machines...Curing Machines (all available with powered-frame widening and transportation rigs)...Subgrade Planers and Testers. Also Curb, Gutter and Sidewalk Forms. CHAIN Belt Company, 4666 W. Greenfield Ave., Milwaukee 1, Wisconsin.

CONSTRUCTION REX MACHINERY

PAVERS • SPREADERS • FINISHERS • FLOATS • CURING MACHINES • FORMS

CHAIN BELT COMPANY

MOTO-MIXERS • BUILDING MIXERS • PUMPCRETE • RAILPORTER • PUMPS

CONTRACTORS AND ENGINEERS

Macks ARE HANDLING THE IMPORTANT JOBS

building the National Highway System!

The road boom's underway! Up to 33 billion dollars worth of new highways to be built. And right now, you're probably asking yourself:

"What kind of hauling equipment will net me the greatest return?"

For the best answer . . . ask any of the thousands of construction firms that have learned to rely on Macks. They'll tell you that their best investment is the kind of equipment that can handle the most punishing loads over the worst terrain and footing without losing precious contract hours for overhaul or repair.

And they'll tell you—*Mack's got it!* Got it in the powerful dependability of the famous Mack engines. Got it in the famous Mack Balanced Bogie with the exclusive Power Divider that allows Macks to move in and work where other trucks bog down. In the many, many other features that have made "Built like a Mack" a trade term for the utmost in stamina, dependability and strength.

Best of all—there's a Mack for every important hauling job. Take a look soon at the Mack 4- and 6-wheel haulers, dumpers and concrete-mixer models . . . with capacities up to 34 tons. You'll quickly see why, wherever you see important work, you'll generally see Macks in action. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

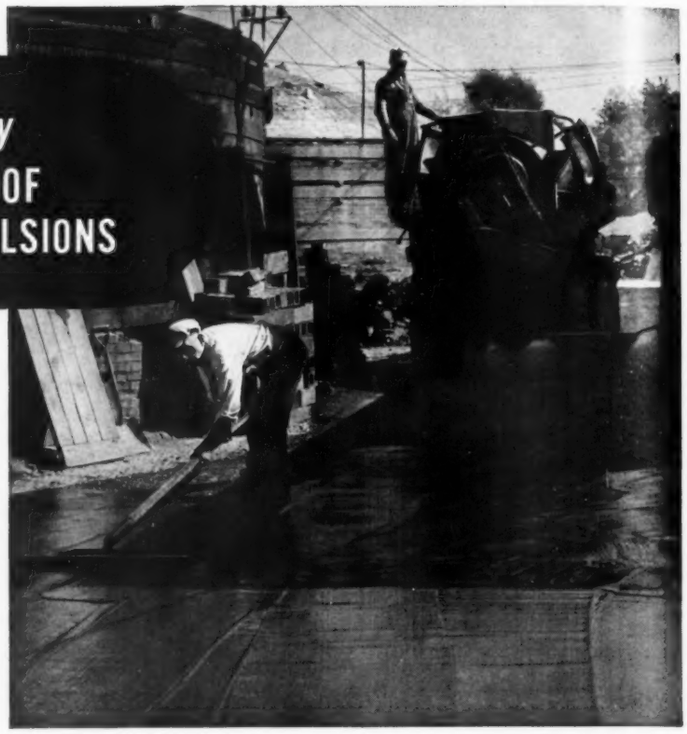
Mack

FIRST NAME FOR TRUCKS

This planned vast national superhighway network will be built by Federal and state government co-operation.

Mack
B63 Mack
Diesel
Thermodyne
Mack 200
woodi

McConnaughay WEATHER-PROOF ASPHALT EMULSIONS



McCONNAUGHAY LICENSEES
Operating K. E. McConnaughay
Emulsified Asphalt Plants

Walsh & Kelly
R. R. #2, *Gary, Indiana*
Bituminous Materials Co.
416 S. Water St., *Jackson, Mich.*
Bituminous Materials Co.
318 Atlantic St., *Bay City, Mich.*
Emulsions, Inc.
Lawrenceville, Illinois
Bituminous Materials & Supply Co.
415 Maple St., *West Des Moines, Iowa*

Plants:
Spirit Lake, Iowa
Iowa City, Iowa
Menlo, Iowa
Emulsified Asphalt Co.
Kuttawa, Kentucky
Bituminous Materials Co.
Escanaba, Michigan
Knight-Bitumen Corp.
Watertown, New York
Seaco, Incorporated
2700 Industrial Drive, *Columbia, S. C.*
E. A. Mariani—Emulsified Asphalt
Hooker's Point, *Tampa, Florida*
Bituminous Materials Co.
Metairie, Louisiana
Serving Alabama, Mississippi, and Louisiana
Asphalt Products Co., Inc.
Powell Ave., *Nashville 4, Tenn.*
Bituminous Materials Co.
P. O. Box 267, *Terre Haute, Ind.*
Wabash Valley Asphalt Co.
Terre Haute, Indiana
Brookman Construction Co.
17th & Gharkey Sts., *Muncie, Ind.*
Fauber Construction Co.
Lafayette, Indiana
Asphalt Materials & Construction, Inc.
960 E. 22nd, *Indianapolis 2, Ind.*
Ready-Mix Asphalt, Inc.
P. O. Box 882, *Fort Wayne 6, Ind.*
Doherty and Swearingen Co.
53 Main St., *Yarmouth, Maine*
James Huggins & Sons, Inc.
Medford & Commercial Sts.
Malden 48, Massachusetts
Albany Asphalt & Aggregates
75 State St., *Albany, New York*
Knight Paving Products, Inc.
1655 Union Rd., *Gardenville, N. Y.*
Knight Paving Products, Inc.
Vine Street, *Ithaca, New York*
Knight Paving Products, Inc.
1980 East Avenue, *Rochester 10, N. Y.*
Eastern Representative:
John A. Dow
157 Church St., *New Haven 10, Conn.*

Exceptionally Effective as Protective Coating for a Wide Variety of Uses

McConnaughay Weather-Proof Asphalt Emulsions offer *high resistance to water during and after construction*... are not washed off during sudden or prolonged rains during or after mixing and spreading; *offer resistance to heat*... do not bleed or soften during hot weather; *offer resistance to cold*... are tough and resilient, not brittle, at temperatures below freezing. All McConnaughay Weather-Proof Emulsions are *available in combination with rubber.*

In mortar mixes, McConnaughay Weather-Proof Emulsions have many protective applications: seal coats for roads and paved surfaces; pressure application to reservoir surfaces for slope stabilization and protection against leakage and erosion; many special uses such as pipe covering, waterproofing, flooring and roofing.

For *erosion control,* McConnaughay Weather-Proof Emulsions are used to bind straw mulch covers for seeded areas; also mixed with soils for sealing of highway banks, railroad right-of-ways, etc. In *reservoir construction,* the emulsion can be mixed with soils and aggregates on bottom and sides, compacted, sealed and the reservoir filled with water immediately. High resistance to erosion and water seepage is assured.

For complete details and specifications, contact your nearest McConnaughay Licensee or write...

SPECIFICATIONS OF THESE COLD-MIX PROCESSES AVAILABLE ON REQUEST

1—Penetration Macadam, 2—Open-Graded Plant Mix, 3—Open-Graded Road Mix, 4—Dense-Graded Plant Mix, 5—Dense-Graded Road Mix, 6—Mat Coat, 7—Seal Coat, 8—Sand Mix, 9—Sand Honing, 10—Patching, 11—Mastic-Mix, 12—Driveway Construction.

K. E. McCONNAUGHAY LAFAYETTE INDIANA
EMULSIFIED ASPHALT *PLANTS AND PROCESSES*

the subcontract was terminated and defendant released all claims against plaintiff, without specifying the claim for indemnity or excepting it from the release. Was plaintiff's liability to indemnify released by this agreement?

THE ANSWERS: (1) No. (2) Yes. (Tully & DiNapoli, Inc. v. Granite Quarries, Inc., 111 N. Y. Supp. 2d 102, decided by the New York Supreme Court, Special Term, New York County.)

The court said that the agreement to indemnify plaintiff was against liability rising from negligence primarily chargeable to defendant, not plaintiff.

Crane-crew borrower not liable in fatality

THE PROBLEM: *A stone contractor's regular employee was killed on a construction job when the cable on a borrowed crane broke. The operator and oilman were furnished by the crane company, but the stone contractor put them on its payroll, deducted social security and old-age benefits from their pay, and directed them in operating the crane. Even if the accident was the fault of the crane operator — which the court found was not true—was the crane company liable?*

THE ANSWER: No. (Ranney v. Hebern Realty Co., 110 N. Y. Supp. 2d 496, decided by the New York Supreme Court, Appelate Division, First Department.)

The decision was influenced by the facts that the accident was caused either by a defect in the cable, which was furnished by the stone contractor, by overloading, or by failure of that company's employees to use ropes, and that it did not appear that the men furnished with the crane were regular employees of the crane company.

The court cited several decisions of the New York Court of Appeals in cases where lessors of cranes were liable for accidents in their operation, but noted that those accidents had been caused by negligent operation of a crane by the crew men furnished with it, and not by fault of the borrowing contractor in furnishing a defective part or in overloading.

Delay damage clause was not waived

THE PROBLEM: *A subcontract for work on a public sewer project specified that the subcontractor would pay the prime contractor $100 for each day's delay in completion. But the contractor's agent assured the subcontractor that if the contractor should close down the work at the request of the sewer district, the subcontractor would not be charged the daily damages, unless the district charged the contractor. Did that supplemental agreement waive the contractor's right to damages for delay due to the subcontractor's fault?*

THE ANSWER: No. (Munday v. Knutson Construction Co., 294 S. W. 2d 371, decided by the Texas Supreme Court.)

Damage from blasting was not accidental

THE PROBLEM: *A contractor constructing a highway above and near a railroad right-of-way was insured against liability for damage "caused by accident". Blasting and clearing operations caused boulders, rubble, and other heavy material to fall upon the railroad track. Did the insurance cover the damage?*

THE ANSWER: No. (Kuchenberg v. Hartford Accident & Indemnity Co., 226 Fed. 2d 225, decided by the United States Court of Appeals, Ninth Circuit.)

The court decided that the falling of the material was the "reasonably anticipated, ordinary, and expected result" of the contractor's operations, and as such not to be classified as an accident. This was so even though the damage to the railroad property was more extensive than had been anticipated.

Contractor's bond covers subcontractor's supplier

THE PROBLEM: *An Arizona building contract required the prime contractor to furnish "all labor and materials". His bond secured performance of the contract conditions. Was the subcontractor's supplier of materials entitled to sue on the bond?*

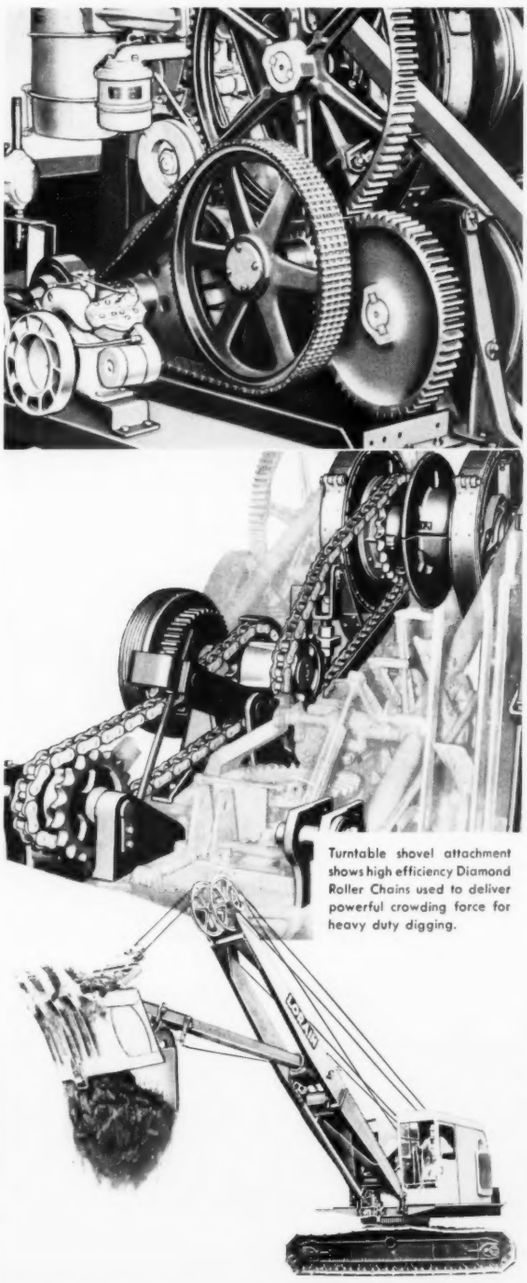
THE ANSWER: Yes. (Porter v. Eyer, 294 Pac. 2d 661, decided by the Arizona Supreme Court.)

The decision rested upon an Arizona statute, which the court said must be regarded as a part of the bond and contract. The statute requires licensed contractors to furnish a bond to the owner binding the contractor to complete the specified contract work, and to pay "all subcontract labor, and material supplier charges.

"If a surety makes a contract with the law before him the law becomes a part of the agreement."

Illegal picketing

THE PROBLEM: *An electrical subcontractor working on a 190-acre housing project employed non-union labor on the six houses in which it was interested. The general contractor, against which a union had no labor dispute, was building 75 other*



Turntable shovel attachment shows high efficiency Diamond Roller Chains used to deliver powerful crowding force for heavy duty digging.

98-99% EFFICIENCY
OF
DIAMOND ROLLER CHAINS

Turns More Engine Horsepower into Useful Work!

The Lorain Series 50 turntable is packed with extra power and strength. The reason is *direct-to-the-point* application of engine power. These excerpts from the Lorain catalog tell why . . . .

". . . There is no long train of power-consuming, efficiency-reducing gears . . . no intervening jack shaft . . . instead a multiple roller chain transmits power directly to the center drive pinion. This pinion, in turn, directly powers the independently clutch-controlled Hoist and Swing Travel Shafts."

For dependable, long-life power take-off drives and for crowding, retracting and propelling, Diamond Roller Chains are first choice with leading manufacturers and contractors alike. Diamond quality means maximum performance at lowest cost.

DIAMOND CHAIN COMPANY, Inc.
Where High Quality is Traditional
Dept. 487, 402 Kentucky Ave., Indianapolis 7, Indiana
Offices and Distributors in All Principal Cities
Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

DIAMOND ROLLER CHAINS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 236

avoid legal pitfalls

houses. Picketing of the four streets that led to the project site was intended to prevent trucks from delivering materials to the general contractor's jobs. Under Arkansas law, was the general contractor entitled to an injunction against this interference?

THE ANSWER: Yes. (International Brotherhood of Electrical Workers, Local Union No. 295, v. Broadmoor Builders, Inc., 280 S. W. 2d 898, decided by the Arkansas Supreme Court.)

The court said that if such picketing were legal, the union could picket all highways leading into the city, Little Rock. The picketing should have been confined to the subcontractor's jobs.

Contract did not cover grading for foundation

THE PROBLEM: *A subcontract specified that a concrete floor had to be constructed at a uniform depth. Neither party knew that because of the uneven ground surface, the rear of the site had to be filled in. This involved a greater cost than the contract work, and therefore the subcontractor refused to proceed until the necessary fill was made. Did that make him liable in damages?*

THE ANSWER: No. (Ferguson v. Sharkey Construction Co., 137 N. E. 2d 525, decided by the Ohio Court of Appeals, Cuyahoga County, Cleveland.)

The court said that there was nothing in the written contract to require the subcontractor to do the necessary grading, and that he was not bound to inspect the site before contracting. Because both parties were unaware of the situation, there could be no mutual agreement as to who was to provide the foundation.

Superintendent's pay

THE PROBLEMS: *A construction superintendent was employed on a federal housing project. Under the terms of the contract he was to receive a bonus based on the sponsoring corporation's net profit. Was he entitled to a bonus based on the amount provided for in the construction contract; or on an escrow deposit required of the sponsoring corporation by the Federal Housing Administration; or on housing rentals received during construction?*

THE ANSWERS: No. (Pacific States Cast Iron Pipe Co. v. Harsh Utah Corporation, 300 Pac. 2d 610, decided by the Utah Supreme Court.)

Break in progress payment justifies work stoppage

THE PROBLEM: *A contract for construction of an electric-power line was modified by the owner, who agreed to make progress payments at 15-day intervals. Did unjustified refusal by the owner to make those payments entitle the contractor to refuse further performance?*

THE ANSWER: Yes. (Northeast Clackamas County Electric Co-Operative, Inc. v. Continental Casualty Co., 221 Fed. 2d 329, decided by the United States Court of Appeals, Ninth Circuit.)

In upholding a decision by the United States District Court for Oregon, the court quoted the statement by the United States Supreme Court in the case of Guerini Stone Co. v. P. J. Carlin, 248 U. S. 334, 39 S. Ct. 102, that where construction covers a considerable amount of time and involves large expenditures, an agreement for progress payments "must be deemed so material that a substantial failure to pay would justify the contractor in declining to proceed".

Delay claim is denied

THE PROBLEM: *A federal housing-construction contract required the government to furnish the lumber, but not to stockpile it. The government had requested the contractors to place orders in advance because materials of different sizes and grades could not be kept on hand. Because of the contractor's failure to place advance orders, which could have been filled on time, the delivery of lumber was delayed. This, in turn, held up the project. Was the contractor entitled to damages?*

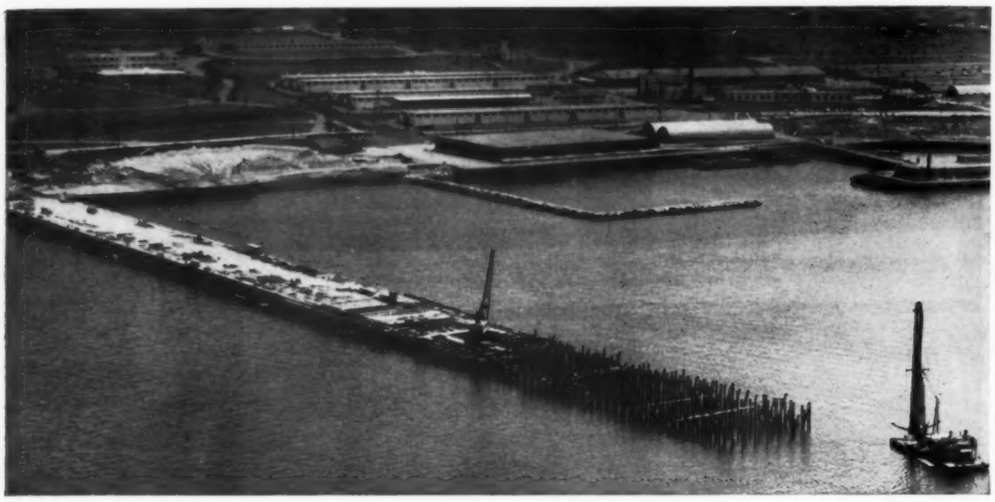
THE ANSWER: No. (A. L. Coupe Construction Co. v. United States, 139 Fed. Supp. 61, decided by the United States Court of Claims.)

Suits against states

THE PROBLEM: *A state is suable only to the extent that it has expressly or impliedly consented. A Minnesota statute authorizes suits against the state on contracts to construct or repair state trunk highways. In such a suit may interest be awarded the contractor on the sum found to be due from the state, from the date that liability accrued?*

THE ANSWER: Yes. (Otto B. Ashbach & Sons, Inc. v. State of Minnesota, 78 N. W. 2d 446, decided by the Minnesota Supreme Court.)

The court said that this was so, even though the state would not be liable, as an ordinary losing litigant would be for court costs.



Monotube Piles provide

STABILITY

for new Navy Berthing Pier

Monotube piles for the 100 feet wide and 1,350 feet long U. S. Navy Berthing Pier at Newport, R. I.

PILE DATA

TYPE—MONOTUBE
DIAMETER—16 INCH
GAGE—3
NUMBER OF PILES—1638
LENGTH—50 TO 110 FEET
LOADING—50 TONS
DISTANCE FROM MUD LINE TO PILE CUT-OFF } APPROX. 30 FEET
DESIGN: BUREAU OF YARDS & DOCKS, U. S. NAVY
CONTRACTOR: RAYMOND CONCRETE PILE COMPANY

THE UNION METAL MANUFACTURING COMPANY
Canton 5, Ohio

UNION METAL
Monotube Foundation Piles

For more facts, use Reader-Reply Card opposite page 18 and circle No. 237

The Viber Model PX8 pneumatic external vibrator operates at speeds sufficiently high to be effective in concrete placement.

External vibrator used in concrete placement

■ A moving-vane-type pneumatic external vibrator that operates at speeds sufficiently high to be effective in concrete placement is available from the Viber Co. The Model PX8 vibrates at from 2,000 to 12,000 or more rpm, depending on the air pressure and the size of the eccentric weight.

The vibrator is recommended for use in concrete-pipe production, for the precasting of such units as prestressed girders and beams, and roof and wall sections, and wherever else reusable steel forms are set up on a production basis. The Model PX8 is also recommended for use in unloading such bulk materials as sand, gravel, and cement.

The motor assembly and the vibrator are housed in a common steel cylinder. By means of the special accessory hardware, the unit is clamped to the outside of the steel form. A hook-type clamp is available to mount the vibrator on wood wales when necessary.

The Model PX8 operates at pressures up to 100 psi and requires 100 cfm of air. Any one of seven interchangeable weights, ranging between 0.2 and 1.7 pound-inches eccentricity, may be used. Because seals retain the oil needed for splash lubrication of the vibrator bearings, the unit can be operated in any position.

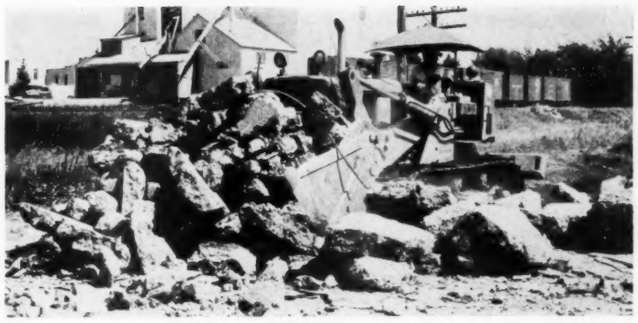
For further information write to the Viber Co., 726 S. Flower St., Burbank, Calif., or use the Request Card at page 18. Circle No. 41.

Fairbanks, Morse changes

A number of changes have been made at different plants by Fairbanks, Morse & Co., Chicago, Ill.

The former manager of the Pomona, Calif., Works, P. R. Flood, has been promoted to the position of general manager of the Beloit, Wis., works. He succeeds W. E. Watson.

W. P. McAnally, manager of the Stuttgart, Ark., works has taken Flood's place at the Pomona works. C. H. Johnson, manufacturing superintendent at the Kansas City, Kans., works, has been named general manager of the Stuttgart works.



A TRIO OF INTERNATIONAL TD-18's equipped with Drott "four-in-one" skid shovels are reported to have done as much work as three power shovels and a dragline, digging up and loading old concrete, on a Minnesota highway job recently. Employed by contractor Henry E. Berghuis, the 134-hp rigs were able to handle 1,700 linear feet of old pavement daily. The Drott shovels enabled the TD-18's to be used as 3-cubic-yard skid shovels, clamshells, or bullclams, or as bulldozers. For more details circle No. 56 on the Request Card at page 18, or write to the **Drott Mfg. Co.**, 3126 S. 27th St., Milwaukee 15, Wis.

"Ahead of schedule"

on 8-mile farm-road job says Texas contractor

Pennington's busy C Tournapulls pass on haul road. Fill area is beyond last scraper. Ability of these earthmovers to work at constant high speeds helped complete farm-road 1093 job ahead of schedule.

"Our 4 'C's' put us ahead of schedule on this job", stated C. E. "Tip" Heatherly, general superintendent for Contractor Dan Pennington, Grapeland, Texas. He was talking about an 8-mi. construction job on farm-road 1093, north of Eagle Lake, Texas, which the firm handled with its Tournapulls.

"These 'C's' work good in anything," Heatherly said. "I like their maneuverability — the way they get in and out of tough spots."

'Pulls handle 90% of yardage

Pennington used a scraper line-up of 4 LeTourneau-Westinghouse C Tournapulls and 1 crawler-with-pan for the 9-month job. The four "C's" (16 yds. heaped capacity) did 90% of the dirtmoving. The two-lane highway was bid jointly by Dan Pennington of Grapeland, Texas and H. Ratliff of Rogers, Texas, in the amount of $442,515, with Mr. Ratliff doing the concrete and Pennington doing the dirt, base and asphalt. Close to 250,000 yards of material had to be moved in the course of road construction.

Loads in wet sand

When work started, machines worked in sand, wet down by heavy rains. Cut was 800′ in length.

Heaping loads of wet sand boiled into bowls of "C's" during road construction near Eagle Lake, Texas. Frequent rains failed to slow scraper production on this winter job.

"Pulls" spread fast in sand. Operators had no trouble in slippery footing. Rig's 90° power-turn and power-transfer differential aided maneuvering when sand was wet.

New C Fullpak even better!

The same dependable performance in rough going can be yours on your next job. For even *better* production, ask about the new 18-cu. yd. C Fullpak Scraper. This high-production "Fullpak" loads fast, boils easy, heaps a big load every time!

Tournapulls hauled an average 1100′ over spongy-footing . . . spread fast over 70′ distance. Cycle distance averaged 2668′.

Tournapull cycle-time was 5.85 min. Other averages were — 1.14 for loading, 2.07 for hauling, 0.44 for spreading, and 2.20 for return. Each machine moved 10 loads an hour. All scrapers worked a 10-hr. day, 5½ days per week.

W. F. Kitchens, Jr., a Pennington operator, said: "I've been running Tournapulls since 1951, and I like the C Tournapull fine — mostly because it's so easy on me."

Tournapull—Trademark Reg. U.S. Pat. Off.
Fullpak—Trademark CP-1054-H-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Where Quality is a Habit

For more facts, use Reader-Reply Card opposite page 18 and circle No. 238

One of the longest straight runs in the piping system for Idlewild Airport's Terminal City development is this 1,100-foot stretch. Bags of Gilsulate insulation are being poured around the steam-heating pipes which lie on concrete slabs just behind the slab wall; pipes in the foregound will carry chilled water.

Special insulation licks underground water problem for huge airport piping system

A gigantic piping system,—the longest non-military high-temperature hot-water heating system in existence—is being constructed at Idlewild Airport, New York City, to bring heat to all the proposed buildings in the $90 million Terminal City being developed at the field. The Port of New York Authority is building Terminal City under an expansion program at the airport. When it is finished in 1960, the new 655-acre facility will be able to handle 140 aircraft at one time.

The 7.34-mile-long piping system will have 53 expansion loops—which alone require more than a mile of pipe—and 38,774 feet of underground pipe.

The biggest difficulty in constructing the system was caused by water—the almost pure sand soil at an altitude about equal to sea level making it impossible for conventional insulating material to be used. This type of insulation would have absorbed the water and broken down, exposing the pipes to corrosion.

A solution was found in Gilsulate insulation, made by American Gilsonite Co., Salt Lake City, Utah. This consists of a granular material made from specially sized, selected, and blended Gilsonites—a solid hydrocarbon.

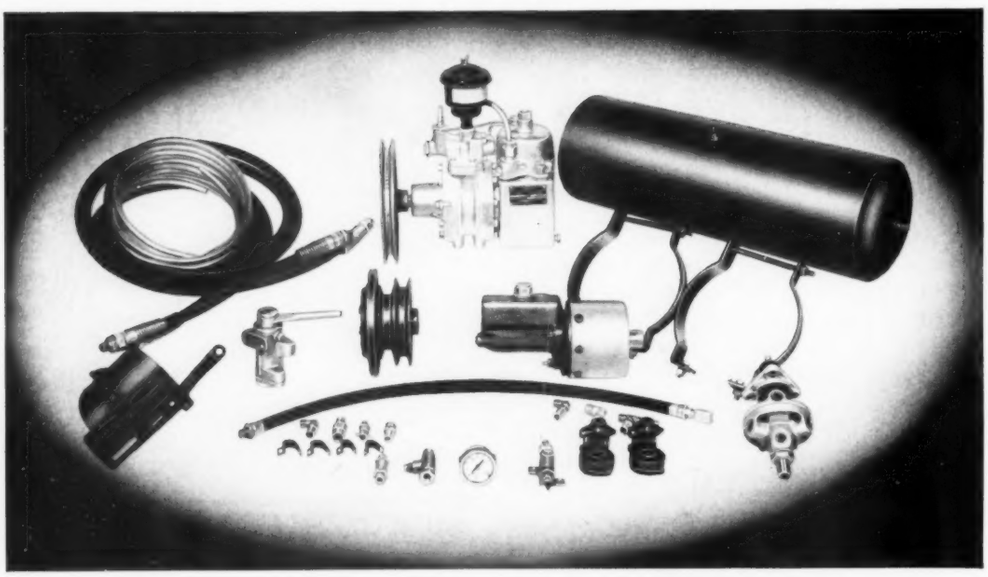
Once concrete slab pads had been placed in the pipe trench, a wall of concrete slabs or blocks erected to contain the pipe, and the pipes placed, the Gilsulate insulation was poured around the line. When steam was turned on, the Gilsulate fused to the pipe, forming successive plastic-to-sintered-to-granular zones of protection against all corrosion. Throughout the entire job, the working area was dewatered until the Gilsulate had cured.

The heating system goes into partial operation in June, and will be ready to supply heat to any of the structures completed and put into use before 1960. The finished system will be able to pipe water at 380 degrees F and return it to the central plant at 240 degrees F. The designer of the system is Seelye, Stevenson, Value, & Knecht, consulting engineering firm of New York, N. Y. The general contractor is Foundation Co., and subcontractors on the job are Almirall & Co., Inc.; Norman Heating Co., Inc.; and Eugene J. Brandt & Co., Inc.

Armco builds new plant

Armco Drainage & Metal Products, Inc., Springfield, Ill., a subsidiary of Armco Steel Corp., Middletown, Ohio, has started work on a new fabricating plant. The plant, which will occupy eight acres, will be built of Armco standard rigid frame construction and wall and roof panels.

The new plant will make galvanized corrugated pipe and pipe arches, paved and coated pipe and pipe arches and Smooth-Flo sewer pipe.



Wagner Air Brake Kits

make it easy for you to convert to a safe, sure air brake system ...provide everything needed for field installation

You'll like the ease—and the moderate cost—of converting your present brakes by using Wagner Air Brake Kits . . . You'll get the benefit of greater safety, reduced maintenance costs, and maximum performance efficiency.

All Wagner Kits contain original equipment type Wagner Air Brake Units, equivalent to those sold to vehicle manufacturers, to provide standard, full-powered air braking systems.

The Kits are complete—all parts are engineered and designed to fit into proper position with little or no drilling and tapping.

Included in each Kit is the famous Wagner Rotary Air Compressor and the Wagner Power Cluster—a single air-hydraulic unit to provide proper air hydraulic ratios for all vehicles.

Act now! Furnish your fleet with the controlled safety protection of Wagner Air Brakes made possible with these kits . . . Send today for your free copy of Catalog KU-201. It contains full information on Kits and also details on all complete Wagner Air Brake Systems. And remember, when ordering new equipment, be sure to specify Wagner Air Brakes.

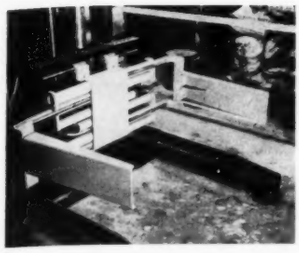
K57-1

Wagner Electric Corporation

6364 PLYMOUTH AVENUE • ST. LOUIS 14, MO., U. S. A.

LOCKHEED HYDRAULIC BRAKE PARTS and FLUID • NoRoL • CoNoX BRAKE LINING • AIR BRAKES • AIR HORNS • TACHOGRAPHS • ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES

For more facts, use Reader-Reply Card opposite page 18 and circle No. 239



Hard-to-handle loads are easily moved without palletization by means of the Load-Grab hydraulic clamp, available optionally on the new Hyster Model AC-20 lift truck.

New lift truck features optional hydraulic arms

■ Greater power and faster, easier operation are said to be among the features of the new Hyster Co. lift truck. The Model QC-20 is available with a new attachment that permits the handling of difficult loads with hydraulically actuated arms.

The truck is powered by a 4-cylinder air-cooled Wisconsin engine and has a capacity of 2,000 pounds. Operating ease and speed are reportedly enhanced by a repositioned instrument panel, improved upright design, and use of a constant-mesh transmission. With dental clutches instead of sliding gears, the transmission shifts more smoothly and lasts longer.

The Load-Grab clamp attachment permits the gripping of hard-to-handle loads from the side, eliminating the need for palletization. A newly available optional side-shift carriage reduces truck maneuvering time by side-shifting entire loads. Another optional feature is UL-approved LP-gas operation.

For further information write to the Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg., or use the Request Card that is bound in at page 18. Circle No. 25.

FOUNDATION CONSTRUCTION

CAISSONS
SHAFTS
DRILLED AND UNDERREAMED
PIERS

SPECIAL DRILLING PROBLEMS

Offices in Atlanta, Ga., Pittsburgh, Pa., Washington, D.C.

Wire or phone for a quotation on your next foundation job —
ANYWHERE IN THE WORLD

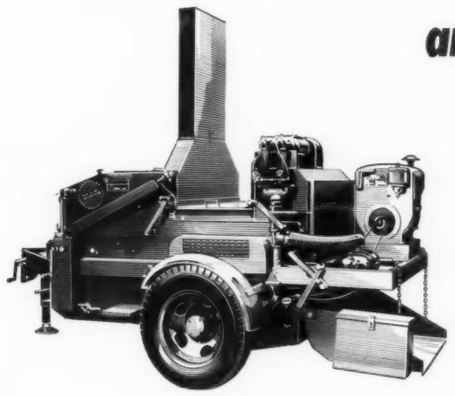
McKINNEY
DRILLING COMPANY
NACOGDOCHES, TEXAS
Ph.: LOgan 4-8373 • P. O. Box 190

For more facts, circle No. 402

TO MANEUVER a barge-mounted 5-ton dredging and pile-driving crane, used for general waterfront improvement work, the Miller Construction Co., The Weirs, N. H., relies on a Johnson outboard motor for motive power. With a deckhand wielding a long pole in the tight, shallow places, the barge, which weighs in the neighborhood of 25 tons loaded, moves along the waterfront at speeds up to 4 mph. So successful was the outboard motor arrangement that the company is planning to add a second unit to the 38 x 18-foot barge. With just the one motor, the barge has made trips up to 15 miles. For more details on the motors write to **Johnson Motors,** a division of the Outboard Marine Corp., Waukegan, Ill., or use the Request Card at page 18. Circle No. 221.

Give each crew its own asphalt plant

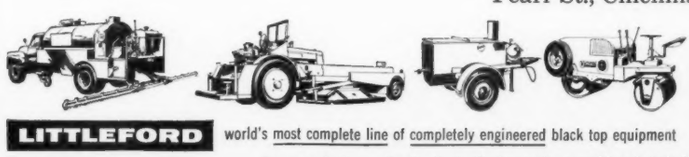
and save $ 2.29 on every ton!



The Littleford Trail-O-Patcher is a complete, self-contained portable asphalt plant. It's so convenient and economical, you can afford to give each crew its own bituminous mixer.

In fact, when you consider the $2.29* per ton saving, it will pay you to keep several Trail-O-Patchers on the job continously. Mix as much as you want, anywhere, any time.

To appreciate the convenience, efficiency and economy of the Littleford Trail-O-Patcher, send for free copy of bulletin 28. Littleford Bros., Inc., dept. LB 178, 485 E. Pearl St., Cincinnati 2, Ohio.

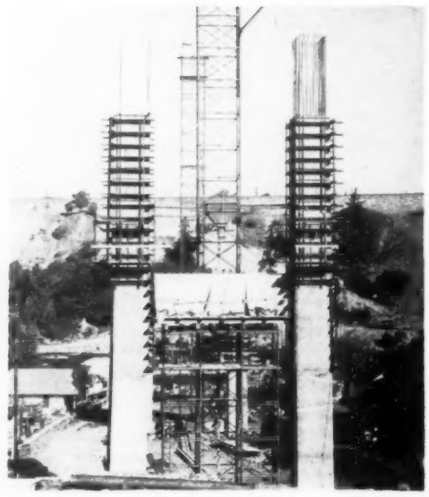


*$7.50 from asphalt plant
5.21 Trail-O-Patcher mix
$2.29 savings per ton

LITTLEFORD world's most complete line of completely engineered black top equipment

For more facts, use Reader-Reply Card opposite page 18 and circle No. 240

Tapered bridge piers built with steel-stiffened forms



Prefabricated, steel-stiffened forms are completed for two of the piers and one of the struts of the Maple Street toll bridge across the Spokane River gorge at Spokane, Wash.

A novel set of steel-stiffened forms —economically built, quickly installed, and easily stripped—is being used for massive pier pours for the 1,800-foot-long Maple Street toll bridge across the Spokane River in Spokane, Wash.

The extra strong forms, making it possible for Morrison-Knudsen Co., Inc., Boise, Idaho, to pour concrete at a rate of 5 feet per hour, are being used on piers up to 120 feet in height and with tapered sides. Altogether, there are 15 piers and three abutments included in the $674,000 contract awarded by the Washington Toll Bridge Authority, the agency supervising the work for Spokane.

Designed by Tudor Engineering Co., San Francisco, Calif., the bridge is being built with the Washington Department of Highways supervising field engineering. After Morrison-Knudsen completes pier and abutment construction in April, deck and steel work will get under way. U. S. Steel Corp. holds the separate contract for this work.

High piers

Of the 15 piers in the deep, narrow canyon, five are type 1 piers that range from 98 to 120 feet in height. They have 7.5-foot bottoms, two legs that taper at 5/32-inch per foot, and two struts for stiffening purposes. The top strut ties the pier legs together; an intermediate strut, 8 feet high, 3 feet wide, and 28 feet long, ties at the mid point of the legs.

The bridge also has seven type 2 piers, ranging from 45 to 78 feet in height. These measure 6.5 feet at the bottom and taper 5/32 inch per foot. The struts on these piers are the same as those for the type 1 piers.

All four type 3 piers are "single barrel" piers ranging from 19 to 68 feet high. They measure 4.5×13 feet at the bottom and have a uniform taper of $\frac{3}{8}$ inch per foot.

The abutments are vertical, range from 15 to 20 feet in height, and have lengths of 100 feet—including the appurtenant wing walls.

Form construction

V. E. Valentine, project manager for Morrison-Knudsen, cooperated with M-K's engineering staff to plan the steel-stiffened set of forms for the pier shafts. All the prefabricated forms turned out for the shafts were planned for 16-foot pours.

One complete set of forms is used for each type of pier so that work can be done simultaneously on all types of pier construction.

The heavy panels, prefabricated at a central carpenter yard at the job site, has a framework consisting of 9-inch, 12.75-pound steel channels placed on 2-foot 4-inch centers. Channels are stiffened by 3×3×5/16-inch angle irons. These also make it possible for the forms to be spliced and hold the platforms used by carpenters and concrete workmen during the pours.

The steel frames that brace the forms were first carefully lined up

Never before so *many* ways to beat job costs!

Every way you work these new POWERlined Minneapolis-Moline Wheelers you're making money. And never before could any industrial tractor work for you in so *many* ways! Here's MM high-torque, high-compression power with big piston displacement and moderate rpm—*real* lugging capacity. And to make that extra power pay you best, these new Wheelers have MM's exclusive Ampli-Torc Drive for 10 speeds forward . . . 2 reverse. You can *double* traction power and drop ground speed 48% . . . under load . . . without shifting or clutching. On PTO jobs, these new MM Wheelers give you power straight from the crankshaft, fully independent of the transmission. MM's integral, rear-mounted hydraulic pumps with capacities up to 35 gallons per minute offer highest hydraulic efficiency at low engine speeds.

MM MINNEAPOLIS-MOLINE POWERLINED WHEELERS

NEW 445 CRAWLER—It's the crawler with features only MM could build—all the POWERlined advantages with new crawler traction. Available in gasoline or diesel models.

NEW 335 WHEELER—New performance, new class in this power and price bracket. Packs 47 bhp, big 167 cu. in. engine, wide choice of integrated hydraulic pumps, Ampli-Torc 12-speed drive.

FEATHER-TOUCH HANDLING—
The man who drives your POWERlined Wheeler devotes his attention to doing the *job*. There's no wrestling the wheel, even on the heaviest, muddiest ground; MM's built-in power steering supplies hydraulic muscles to do 90% of the work. One-lever Ampli-Torc Drive control, smooth-acting double-disc brakes, and scientifically located controls help cut jobs times to a brand new low.

CAPACITY THAT CAN TAKE IT—
Your POWERlined Wheeler carries its power on a backbone that can take the heaviest strains of front or rear loads. Heavy cast crankcase, transmission housings, and final drive units are joined by wide flanges to form single-unit rigidity. Heavy-duty industrial front ends and tires take rated capacities right in stride. This recognized MM construction means long trouble-free life under heaviest, continuous-load operation.

PROVE 'EM—ON THE *JOBS* YOU DO!
Find out what these new POWERlined Wheelers can do to speed *your* jobs. Ask your MM Distributor for an on-the-job demonstration, with the mounted equipment you need.

AT THE ROAD SHOW . . .
SEE 445 UTILITY WHEELER—57 Engine bhp.
445 INDUSTRIAL WHEELER—57 Engine bhp.
335 INDUSTRIAL WHEELER—47 Engine bhp.
NEW 445 CRAWLER—57 Engine bhp.

The GOLDEN POWER LINE
MINNEAPOLIS-MOLINE
INDUSTRIAL POWER DIVISION • MINNEAPOLIS 1, MINNESOTA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 241

and drilled in two-foot increments as one of the first steps in the fabricating operation. After the steel strongback system had been fabricated, the channels were faced with 2×6-inch fir lumber, which was in turn faced with sheet plywood nailed to the lumber facing. Panel edges are fitted together to form a leak-resistant joint during the pouring operation and to make stripping easy.

The forms, set in place by crane, are tied together by bolted connections. Additional lining and stiffening is provided by heavy hog rods that keep the form immobile, even though the 8×8-foot pier legs often are poured at rates up to 5 feet per hour.

On struts—and on abutment construction—Universal Uni-Form panels are used exclusively. The patented sections are set in place and bolted together by the patented Uni-Form connecting device.

Novel, too, is the method of shoring or supporting strut forms. Valentine uses Northwest tubular steel scaffolding—manufactured in Seattle, Wash., —the same type of scaffolding used in the hoisting towers that place the concrete. The usual maximum safe working load on this scaffolding is 33,000 pounds per leg, but Valentine is calculating his work loads on the basis of 12,000 pounds per leg. The tubular towers have proved strong enough to hold the heavy strut forms during construction.

Concrete work mechanized

The concreting operation has been entirely mechanized, from batch plant to pour. Ace Concrete Co., Spokane, a commercial firm, furnishes mixed concrete to the job in a fleet of Jaeger and Blaw-Knox truck mixers. The truck mixers back to the foot of the hoisting towers, each of which is served by a small diesel or gas-driven American two-drum hoist. As concrete is dumped into the hoisting hopper, the operator raises each load up to a secondary distribution or transfer hopper high on the tower above the pour. A swing spout and chuting system distributes the concrete directly to the pier or strut forms, eliminating the need for buggies. Viber internal electric vibrators are being used to consolidate concrete. All curing is being done with wet burlap. The strongback forms have worked so well that no measurable deflection or distortion of the concrete surface has been detected in the first 50 per cent of the work.

Site poses no problem

Preparation of the bridge site for construction was not too difficult. The bridge is located just below a hydroelectric power plant, and river stages did not fluctuate too widely during the time the river piers were rising above the river's bed of black lava rock. Valentine took no chances. He drove steel sheet piling around all areas that might have had to be unwatered. One pier footing, which lay exactly over the original river channel location, was probably sheet-piled needlessly, for the hard rock formation at this point remained perfectly dry, even though excavation went down 25 feet. In the river section proper, where the steel sheeting was necessary, Jaeger and Rex pumps

A Lima crane uses a Vulcan No. 1 pile hammer to drive a pilot wood pile at an approach to the bridge.

Pike's Peak overlooks east side of Ute Pass in Colorado. Motorists travel highway safely, securely on asphalt.

Tourist attraction in Colorado—

Good Roads with STANDARD Asphalt

Motorists want good roads. They like to drive on asphalt. Contractors building roads in Mid-America benefit by specifying STANDARD Asphalt. Here's why:

1 Assured source of supply. Standard Oil has a demonstrated record of deliveries on contract. Contractors know that when they order from Standard, they have an assured source of supply.

2 Convenient source of supply. Tank car and tank truck deliveries are made from five conveniently located Standard Oil refineries.

Wood River, Illinois — Casper, Wyoming
Whiting, Indiana — Neodesha, Kansas
Sugar Creek, Missouri

3 Complete line. Standard Oil makes a full line of paving asphalts. They meet most rigid requirements.

4 Experienced asphalt sales specialists. Standard Oil men who sell asphalt know road construction, know what a contractor's needs and problems are. They know how and what to do to give a builder service on asphalt.

Get more information about the advantages of ordering STANDARD Asphalt. Call any of the 23 Standard Oil offices in the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY
(Indiana)

STANDARD

For more facts, use Reader-Reply Card opposite page 18 and circle No. 242

kept the areas dry during the initial stage of construction.

Under some of the piers is a support footing of straight and battered Armco steel shell piles filled with concrete. These were generally used under piers located on the sides of the canyon and also under the abutments, where it was possible to scoop out favorable working locations with a dozer.

These shell piles were installed under a subcontract by the Spokane firm of Larson Construction Co. It used a set of stationary leads, a Lima crane, a Vulcan Type 1 single-acting hammer, and a Jaeger 600-cfm rotary compressor to drive the piles.

Personnel

Assisting project manager V. E. Valentine for Morrison-Knudsen Co. are Gene White, project engineer, and John Hickox, office manager.

THE END

Diesel engine repair

■ A bulletin describing the diesel engine repair service offered by the Guth Co. is available from the company. The bulletin describes the firm's cast-iron fusion process and its exchange setup on cylinder heads. Several before and after photographs are included. The company repairs diesel engines of all manufacturers.

To obtain this bulletin write to the Guth Co., 1400 N. Chestnut, McPherson, Kans., or use the Request Card at page 18. Circle No. 8.

STUPID, SILLY, GOOFY HARRY'S USED CONST. EQUIPMENT LOT MAKE YOUR OWN OFFER!
OFFER ANYTHING
ANY OFFER ACCEPTED!
MAKE YOUR OWN DEAL!
A ONE OWNER BARGAIN
A REAL DOZY!
MORTON TOWNSEND

"Three hundred? What do you think I am, crazy?

Wobbler feeder-scalper

■ New literature covering a wide range of sizes of the Wobbler chain-driven feeder-scalper for uncrushed aggregates is available from the Universal Engineering Corp. The feeder line gets its name from the elliptical-shaped bars that form the bottom of the receiving hopper. Positioned alternately vertically and horizontally, the bars turn synchronously, maintaining the same relative positions.

The effect is to impart a rocking, tumbling action to shot rock on the Wobbler bed. The action removes as much as 96 per cent of the fines from the oversize through spaces between the bars, the manufacturer states, even in wet material. Oversize, cleaned of adhering fines, is carried off the end of the combination feeder-scalper.

The smallest model is a 10-bar 5⅝-inch-pitch unit with a 2-foot-wide bed. The largest model has a 9-inch pitch and is available 3 or 4 feet wide. Its capacity is up to 300 tph, depending on its speed, the spacing of the bars, and the type of material.

To obtain this literature write to the Universal Engineering Corp., 625 "C" Ave., N. W., Cedar Rapids, Iowa, or use the Request Card at page 18. Circle No. 3.

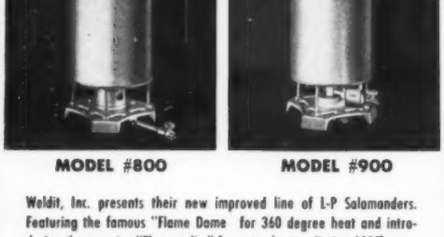
Bituminous plant

■ A folder describing the Model 840-B continuous-mix asphalt plant is available from the Barber-Greene Co. The plant is rated at 50 tph on cold mixes and 45 tph on intermediate and hot-type mixes where dried and heated aggregate is required.

Through use of job photographs, model photographs, and cutaway drawings, each plant setup is illustrated, and the relationship of the various components—mixer, dryer, gradation control unit, elevators, and feeders—is shown. One section is devoted to the special operating features of each of the component units.

To obtain this folder write to the Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill., or use the Request Card at page 18. Circle No. 51.

Weldit THERMO-DISC SALAMANDERS



MODEL #800 MODEL #900

Weldit, Inc. presents their new improved line of L-P Salamanders. Featuring the famous "Flame Dome" for 360 degree heat and introducing the amazing "Thermo-disc" for extra heat radiation. 100% automatic shut-off on Model #900. Tank top Model #1850 also available.

Canadian Distributor: ALLOY METAL SALES 181 Fleet St., E., Toronto 5, Ontario

Weldit INC. SINCE-1918 990 OAKMAN BLVD. DETROIT 38, MICHIGAN

For more facts, circle No. 243

Loosens FROZEN PARTS FAST!

Handy
Won't Leak
Shoots 3 Feet

Same formula as famous Kroil that has pleased 14,000 industrial users for 10 years or more.

Loosens stuck together metal parts, bushings, bearings, bolts, screws, pipe, etc., "anything from an embalmer's needle to a bulldozer," one customer said.

"Like an extra employee," said another. "Turned rust into mush, put $50,000 equipment back to work."

You too can get these results.

Try Aerokroil at our risk. Send $2 cash, and we'll pay postage.

KANO LABS. 1057 S. Thompson Lane Nashville 11, Tenn.

12-OZ. CAN $2. F.O.B. NASHVILLE CASE OF 12 $18.75

For more facts, circle No. 244

Fast-Automatic Snow Plow Lifting

with

MONARCH DYNA-MIGHT POWER HYDRAULIC CONTROLS

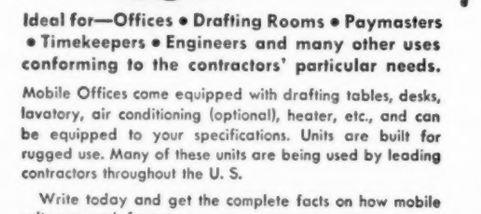
Fan Belt or Electric models available for practically all makes of trucks. See your dealer or write for full details.

MONARCH ROAD MACHINERY COMPANY 1331 Michigan St., N.E. Grand Rapids 3, Michigan

1856 100 YEARS 1956

For more facts, circle No. 245

Leading Contractors Demand the Genuine "Mobile Office"



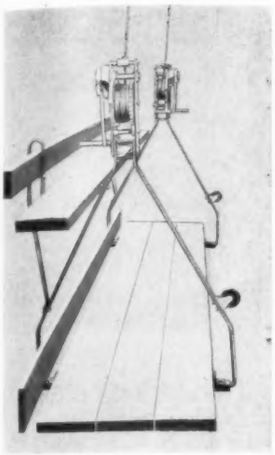
Ideal for—Offices • Drafting Rooms • Paymasters • Timekeepers • Engineers and many other uses conforming to the contractors' particular needs.

Mobile Offices come equipped with drafting tables, desks, lavatory, air conditioning (optional), heater, etc., and can be equipped to your specifications. Units are built for rugged use. Many of these units are being used by leading contractors throughout the U. S.

Write today and get the complete facts on how mobile units can work for you.

MOBILE OFFICE, INCORPORATED 7300 Stony Island Avenue, Chicago 49, Illinois PHONES DOrchester 3-1048-9

For more facts, circle No. 246



Three-way fall prevention is one of the important features of the Safway light-duty Budget Swing stage.

Swing stage incorporates triple fall prevention

■ A light-duty swing stage that offers three-way fall prevention is announced by Safway Steel Products, Inc. The stage, called the Budget Swing, can be raised or lowered at speeds up to 20 fpm.

The three automatic protective devices consist of a mechanical brake built into the direct-drive gear mechanism, a spring-loaded pawl that positively engages the winch drum with the stirrup, and a handle-stop that prevents the winch handle from reversing itself inadvertently.

The Budget Swing has a 30-inch-wide working platform, an 8-inch-high toe board, and 8-inch-wide material platform located at hip level, and a 2×4-inch guard rail. Working capacity, including a safety factor of 4 to 1, is 700 pounds, 350 pounds per winch-and-stirrup unit.

For further information write to Safway Steel Products, Inc., 6234 W. State St., Milwaukee 13, Wis., or use the Request Card at page 18. Circle No. 23.

Flat-bed transport truck

■ A bulletin describing the Model 3000 Util-I-Deck truck, equipped with a special body for handling structural beams, steel fabrications, piles, and like units, is available from The White Motor Co. The truck is reported to provide 22 per cent greater payload capacity for these specialized loads.

The location and design of the Model 3000 one-man offset cab gives 34 square feet of extra floor space. It is available on all Model 3000 chassis, both tandem and single-axled. The special body was designed by Mayer-Pollock, Pottstown, Pa.

The bulletin describes the features of the Model 3000 and discusses the ease with which the rig handles difficult loads. The extra capacity and low maintenance costs are also discussed. The dimensions of the Model 3000 Util-I-Deck are covered in a set of diagrams.

To obtain Form AD-419 write to The White Motor Co., 842 E. 79th St., Cleveland 1, Ohio, or use the Request Card at page 18. Circle No. 39.

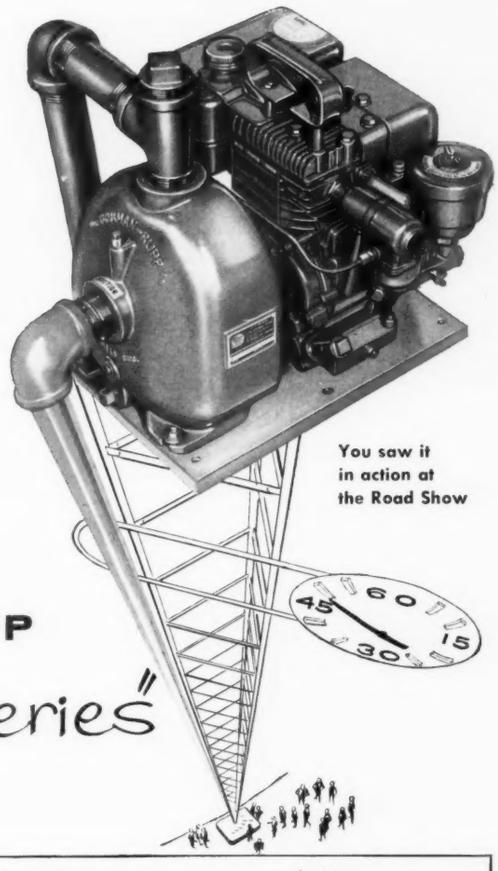
WHEN THE HUGE U. S. GOVERNMENT QUONSET HUT in Toulon, Ill., began truss-busting at the seams from the weight of the grain stored in it, heavier bolts and straps had to be installed in the reinforced-concrete floor to keep the building's sides from spreading. The job called for 250 holes, 6 inches in diameter and 4 inches deep. The task was first attempted with carbide drilling equipment but, after two carbide drills were consumed in drilling only eight holes, the contractor decided another method was required to do the job profitably. After rejecting pneumatic or electric equipment because of the extensive breakout that would result around the holes, the contractor chose a Truco portable drilling machine. The rig required only three or four minutes drilling time after four or five minutes setup time per hole. Averaging 83 holes per bit before resetting, the contractor completed the entire job in 64 hours of operation. For more information on Truco equipment write to the **Wheel Trueing Tool Co.**, 3246 W. Davidson Ave., Detroit, Mich., or use the Request Card at page 18. Circle No. 222.

NOW!

Freedom from pumping failure!

SELF-PRIMING

Important announcement to pump users! Here is a pump that never fails, never quits. Solids do not foul this pump. This new Gorman-Rupp design has *straight-in* suction. Pumped liquid enters direct to the eye of the impeller—increased capacity, higher efficiency, higher lift. Simpler. Fewer parts. Now available in sizes 1½", 2" and 3".

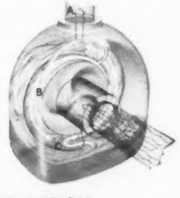


You saw it in action at the Road Show

GORMAN-RUPP

New "80 Series" Pumps

PUMP AT REST
Captured liquid retained for priming. Note the absence of the usual check valve.



PRIMING ACTION
Entrained air (B) escapes at (A) to be discharged. Priming liquid returns (C) to entrain more air.

PUMPING ACTION
Straight-in suction voids entrance restrictions. Water enters direct to eye of impeller.

CHECK THESE NEW-DESIGN FEATURES!

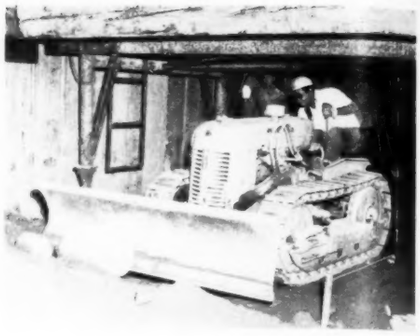
- Straight-in suction
- No check valve
- Lighter in weight
- Long-life mechanical shaft seal

Engine or motor driven. Base or wheel mounts.

THE GORMAN-RUPP COMPANY
305 Bowman Street • Mansfield, Ohio

For more facts, use Reader-Reply Card opposite page 18 and circle No. 247

Excess dirt is cleaned up in the excavation by an Oliver OC-3 tractor.



Small work area keeps caving to minimum on storm drain job

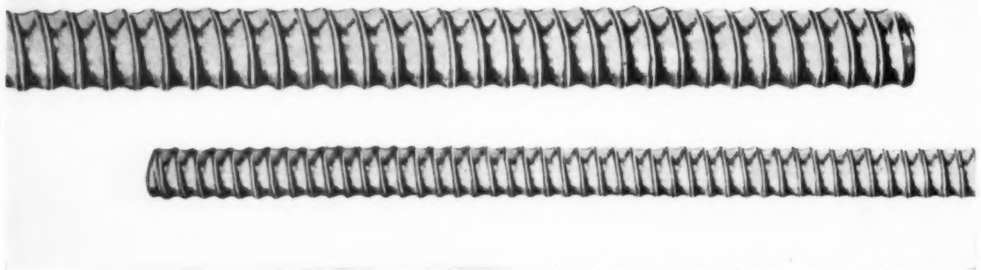
Timber sheeting supported by special portable jumbo in trench; concrete forms are moved ahead after pours in 600-foot sections

Badly caving sand in a deep excavation and numerous utility lines created difficulties during the construction of the big single-section reinforced-concrete storm drain under one of the main streets in Glendale, Calif. But the contractor, a joint-venture firm of Pacific Allied, Verdugo City, Calif., and MacDonald & Kruse, Sun Valley, Calif., kept the work confined to short stretches and mechanized operations as much as possible to beat these problems. Their job has gone so well that the entire project is expected to be completed this month—2½ months ahead of the schedule allowed by contract.

Designed and constructed under the supervision of the Los Angeles County Flood Control District, with funds from the regular budget, this two section project was done under two contracts totaling $854,000. The job called for 3,100 feet of reinforced-concrete single-section box, 23 feet wide × 15 feet 3 inches high in outside dimension. Side wall thicknesses are 17 inches, the invert is 24 inches thick, and a 21-inch-thick deck covers the top of the structure. Excavation went as deep as 28 feet.

The drain starts at Verdugo Wash and extends up some of the main streets in Glendale to a terminal at Verdugo Ave. Under a future contract, the structure will be extended as a tunnel under low-lying hills so that drainage will be assured for the Chevy Chase and Flintridge areas.

The drain passes through an al-

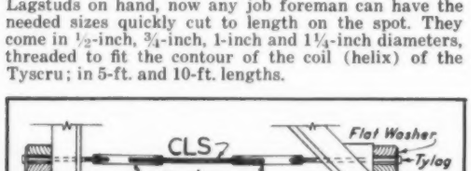


Richmond Continuous Threaded Lagstuds; available in ¼" to 1¼" dia.

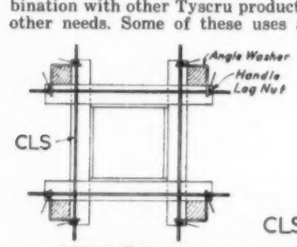
Concrete Form Tying Headaches Solved *on-the-spot* with Multi-Purpose Richmond Lagstuds

15% of concrete form tying work is "special"—hinging on conditions which develop as the job moves along. Before Richmond developed its Continuous Threaded Lagstud Rods, those special conditions were costly headaches. They always had meant lost man hours while "special" tys were built or "special" orders were filled.

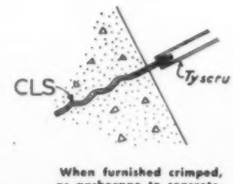
With a supply of Richmond's Continuous Threaded Lagstuds on hand, now any job foreman can have the needed sizes quickly cut to length on the spot. They come in ½-inch, ¾-inch, 1-inch and 1¼-inch diameters, threaded to fit the contour of the coil (helix) of the Tyscru; in 5-ft. and 10-ft. lengths.



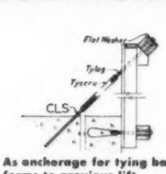
Lagstuds are among the most versatile members of the Richmond Tyscru family. Used alone, or in combination with other Tyscru products, they fill numerous other needs. Some of these uses are illustrated here.



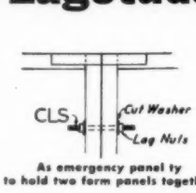
With Handle Lagnuts for exterior columns or bulkhead tys



When furnished crimped, as anchorage to concrete where additional anchorage is needed in winter or below-strength concrete

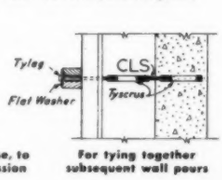


As anchorage for tying back forms to previous lift

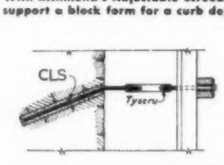


As emergency panel ty to hold two form panels together

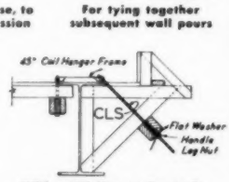
With Richmond's Adjustable Screed Base, to support a block form for a curb depression



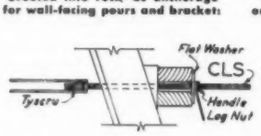
For tying together subsequent wall pours



Grouted into rock—as anchorage for wall-facing pours and brackets



With a 45° Hanger Frame-Ty on the fascia beam of a bridge



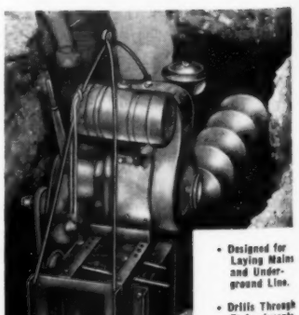
With Handle Lagnut and flat washer as an emergency Ty-lag substitute

The new Richmond Handbook describes the Richmond Adjustable Tyscru System and the entire Richmond line in detail. It is yours for the asking. To get it—or for help in solving a particular concreting problem—write: RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N.Y. or 315 So. Fourth St., Saint Joseph, Mo.

INSIST ON RICHMOND
... AND BE SURE IT'S RICHMOND!
Richmond
SCREW ANCHOR CO., INC.
816-830 LIBERTY AVENUE · BROOKLYN 8, N.Y.
315 SOUTH FOURTH ST. · ST. JOSEPH, MO.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 248

CUT DIGGING TIME and COSTS with the LOW COST PREWITT HORIZONTAL DIGGER



- Designed for Laying Mains and Underground Line.
- Drills Through Embankments.
- Drills Under Highways and Sidewalks.

Prewitt's new HORIZONTAL DIGGER gives low cost, high speed performance for all horizontal drilling up to 48 feet in all types of soil. Rugged, maneuverable, it mounts easily on skids . . . requires small operating space.

See Your Dealer or Write for FREE LITERATURE

J.R. PREWITT AND SONS SINCE 1929

Dept. 202 • Pleasant Hill, Missouri • Phone 40

For more facts, circle No. 249

Prefabricated form panels are about to be set and concrete chuted from the Challenge truck-mixer for a pour on the storm drain. In the background, a dragline uses a McCaffrey 2-yard bucket to dig the ditch and a crane sets timber sheeting. All work was kept closed up in a 600-foot length of trench.

luvial fan of dry, caving sand material that tended to cave badly during excavation. Caving was so bad in many places that street curbs and sidewalks were lost. Because of this, the contractor set solid 4×12 Douglas fir timber sheeting along the sides of the excavation within two hours or less of the time trench sections were opened. Concrete operations were done quickly with small machines, keeping all operations stretched out to a maximum distance of only about 600 feet.

Actual excavation was done under a subcontract by Emsco Pavement Breaking Corp., Los Angeles, which used an Emsco truck-mounted pavement breaker for the demolition of street surfacing just ahead of the digging operation. A dragline with a McCaffrey 2-yard dragline bucket mucked out the ditch, digging the center of the cut first, then bringing in the sides to stand at as steep an angle of repose as possible.

The biggest difficulty for the dragline was excavating near the 8-inch vitrified-clay sewer line that was 5 feet from where the storm drain box was to be located, and near the 12-inch castiron water main, 7 feet away, that was far enough under the surface to threaten a cave-in. After

(*Continued on next page*)

DUDGEON HYDRAULIC JACKS

SALES RENTALS

CAPACITY TO 600 TONS

FOR:
PILE TESTING
UNDER-PINNING
BRIDGES
PIPE PUSHING
SOIL TESTING

DESIGNERS and MANUFACTURERS OF

Hydraulic Units For Special Applications

RICHARD DUDGEON INC. EST. 1850

789 BERGEN STREET BROOKLYN, N. Y.
• ST 9-4040 •

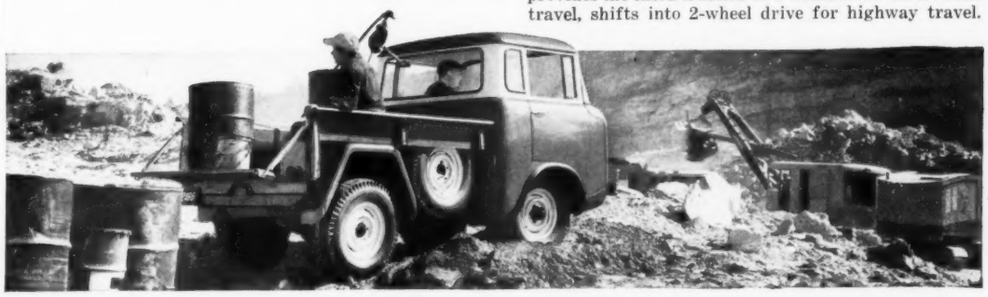
For more facts, circle No. 250

New capacity!

The completely new Forward Control 'Jeep' FC-150—the first time a 4-wheel-drive Truck has so effectively combined maximum cargo capacity with exceptional maneuverability! New Forward Control design puts a 74" pickup box on an 81" wheelbase. And the FC-150 retains famous 'Jeep' ruggedness and versatility.

New maneuverability!

It's the world's shortest turning 4-wheel-drive Truck! For safer off-road maneuverability, it gives you up to 200% greater forward visibility. Powered by the engine that made 'Jeep' vehicles famous, the new FC-150 provides the extra traction of 4-wheel drive for off-road travel, shifts into 2-wheel drive for highway travel.



New style!

The new look and feel of tomorrow! The FC-150's Safety-View Cab combines beauty with utility. Its new wrap-around windshield is the largest in the 5,000 GVW class. There's plenty of extra leg and head room. Here is new styling, comfort, convenience and safety all in today's most advanced 4-wheel-drive Truck.

New 'Jeep' 4-Wheel-Drive / Forward Control FC-150

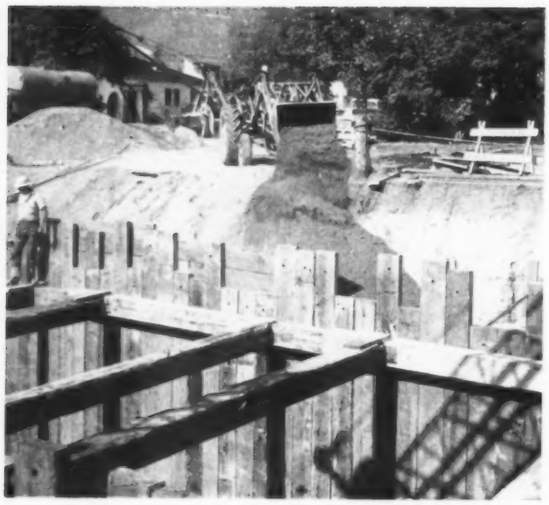
...other members of the famous 'Jeep' family:

Universal 'Jeep' | 'Jeep' Truck | 'Jeep' Utility Wagon

Willys... world's largest makers of 4-Wheel-Drive vehicles

See 'Jeep' vehicles at your WILLYS *dealer*

For more facts, use Reader-Reply Card opposite page 18 and circle No. 251



As soon as the timber sheeting has been placed in the excavation, it is backfilled with material excavated from the trench. The backfill job here is handled by a Ferguson-mounted front-end loader.

(*Continued from preceding page*)

some thought, trial, and error, a successful method of excavation was worked out for the dragline.

As the machine finished the rough excavation along the sides of the trench, small clay spades were used from above to shave down the overhanging material at the top of the trench. As this was being done, a small Oliver OC-3 tractor with bulldozer worked on the bottom of the trench, pushing loose dirt up to the dragline. As soon as practicable, a P&H Model 255A truck-crane moved in to set the solid 4 × 12 Douglas fir timber sheeting that supported the excavation until concrete was placed.

Trench braces, from the sheeting to the sloping banks, were set promptly on 6-foot centers.

The little Oliver tractor proved very helpful during excavation, since it was small enough to work under the bracing struts and powerful enough to handle a sizable part of the marginal excavation along the ditch bottom. Good control of the dozer blade made it possible to reduce the entire labor crew to only six men, who also handled fine-grading.

Timber sheeting, which was handled by the P&H 255A, was set against a tubular jumbo specially made to

Concrete crews train concrete down to an invert pour through a Gar-Bro elephant trunk. Walls and deck of the structure will be placed after the 40-foot invert pour is completed.

PRESSTITE No. 99*

THE TOUGHEST, MOST ECONOMICAL SEALER AVAILABLE for AIRFIELD PAVING JOINTS

- Resists being BLASTED OUT by terrific jet engine thrust.
- Resists MELTING and BLOWOUT from super-elevated temperatures from jet after-burners.
- Resists SHOCK and IMPACT from heavy aircraft.
- Unaffected by jet fuel spillage.

WRITE for illustrated copy of Bulletin 99

- A Two-Component, Cold-Applied Sealer
- For Sealing Sawed and Formed Joints
- * Meets Federal Specification SS-S-170, 23 May 1955

Also Presstite No. 77 cold-applied non-JFR joint sealer.

PRESSTITE SEALING COMPOUNDS
PRESSTITE-KEYSTONE ENGINEERING PRODUCTS COMPANY
KAP

A Division of AMERICAN-MARIETTA COMPANY
3788 CHOUTEAU AVENUE, ST. LOUIS 10, MISSOURI

For more facts, use Reader-Reply Card opposite page 18 and circle No. 252

Do Your Own Repair and Construction Work Right on the Job Using Your Own Men and This Valuable New Welder

Weld anywhere independent of power lines. One engine furnishes power for welding and transportation—no tying up extra trucks or man power—no waiting on outside help or costly replacement parts. Save hundreds of dollars on construction, emergency repair and special build-up work. Get the complete story—mail the coupon today. HOBART BROTHERS CO., BOY **827**, TROY, OHIO, Ph. Federal 2-1223.

"On the spot" welding repairs make the HOBART WELDMOBILE *pay for itself quickly!*

Hobart

HOBART BROTHERS CO.
Box 827, Troy, Ohio, Ph. FEderal 2-1223.
Without obligation, send complete information on the following:
☐ Weldmobile ☐ 250 amp. "Contractor's Special"
☐ "Husky Boy" Air-Cooled ☐ Arc Welder with 110 v. auxiliary power.
Name_____
Address_____
City_____ State_____

250 amp. "Contractor's Special"

"Husky Boy" Air-Cooled

For more facts, use coupon or circle No. 253

This Bucyrus-Erie 22-B loads bracing timbers to a truck as the work moves ahead. All equipment and materials were constantly being moved as the 600-foot work area progressed foot by foot.

support the sheeting from the side and to permit two rows of 12 × 12 fir wales and cross braces to be set. This jumbo was equipped with wire rope slings so that it could be picked up and moved ahead easily after a 16-foot section of sheeting had been installed. Legs rested on Simplex jacks. As sheeting was placed, a small Ford rubber-tire tractor with a front-end loader placed backfill between the sheeting and the sand bank. By holding the time between excavation and placement of this backfill to approximately 1½ hours, it was possible to hold caving banks to an absolute minimum. Material for the front-end loader was dumped in stockpiles from time to time by an excavator or the six 10-wheel International trucks and one Ford semi used during excavation work.

Concrete work done quickly

To keep the concrete work closed up as much as possible, the contractor arranged a fast placing setup. The sides of the 4 × 12 fir support sheeting had been set so that it outlined the outer form of the conduit barrel. Asphalt-impregnated paper was used between the wood and concrete to facilitate the stripping of the sheeting. Each pour, 40 feet long, started with the placement of the invert up to a construction key point just above the chamfered edge on the inside of the lower wall. The walls and deck were then poured. The lower row of wales and struts was removed just after the invert concrete had hardened.

The contractor developed three complete sets of prefabricated wooden form panels for the concrete work, each set consisting of four sections 10 feet long. Set in place by a small, portable dolly and bolted together, these sections were adjusted to final elevation by Simplex jacks, then secured by heavy timber spreaders placed near the bottom. To make stripping as easy as possible, the contractor sprayed the plywood-lined facing of these sections—just before reinforcing steel was placed—with a light coating of Andarin 46 form oil, a product of Tidewater Associated Corp. of California.

Seven invert pours were completed before concrete was placed for the walls. The placing sequence required forms to be placed two pours apart. Simply by moving these forms ahead after they had been stripped, the concrete work was kept closed up tight.

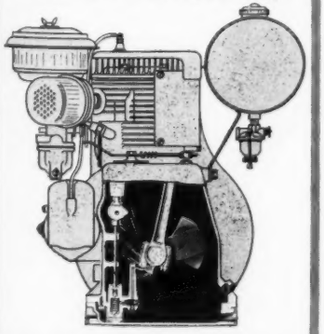
The concrete, a 6-sack mix, was furnished to the job by Consolidated Rock Products Corp. in Challenge truck mixers. Gar-Bro chutes and elephant trunks were used for invert pours; another method was used for wall and cover pours.

After concrete had been stripped, it was cured by Sealtex membrane. The 4×12 fir sheeting was then pulled by the P&H 255A truck-crane and moved ahead for the next setting. The entire job at all times remained within a distance of 600 feet—equal to the amount of sheeting available on the project.

Backfilling was done by hauling in some of the excavated material that had been stockpiled nearby and flooding this material to a point just above the top of the structure. The remaining material was placed with optimum moisture and compacted by loaded trucks and dozers passing over it. After a short period to allow for settlement, the street pavement will be replaced by contractors.

THE END

...another reason why WISCONSIN ENGINES rank 1st in the world, 3 to 37 hp.



POSITIVE Lubrication

Lubrication systems on Wisconsin Heavy-Duty Air-Cooled Engines require less frequent attention, yet offer the best protection against engine wear. For example, the smaller models are supplied with a pump-circulated splash system, providing surest lubrication even when oil is at a very low level.

On larger models, a geared lubrication pump delivers an individual oil stream to each connecting rod. All other moving parts are lubricated by oil spray.

Get more service from the engine with less servicing to the engine. Specify Wisconsin Engines on your equipment. Write for bulletin S198, including handy service map, list of distributors and covering single-cylinder, 2-cylinder and V-type 4-cylinder models, 3 to 37 hp.

WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WIS.
World's Largest builder of heavy-duty air-cooled engines.

Better Performance Depends on Better Features

A7-6051-⅓A

For more facts, use Reader-Reply Card opposite page 18 and circle No. 254

California contractor estimates:

Time and labor costs cut 75% with the Remington Stud Driver

Out on the California coast, "Research House" has taken shape. It's an experimental house sponsored by Associated Architectural Publications and the latest tools have been used to build it—such as the Remington Stud Driver.

Contractor Bert Pickney says, "The Stud Driver cuts time and labor costs around 75% in anchoring beam supports, partition sills and furring to concrete. It took us only half a day to install the sills—a 2-day job with bolts. No pre-drilling is necessary, and sills are set tight! I certainly recommend the Stud Driver to any contractor!"

YOU CAN SPEED ALL STUD FASTENINGS—light, medium and heavy-duty—with the Remington Stud Driver. It sets *both* ¼" and ⅜" diameter studs in steel or concrete—up to 6 studs a minute either size. The tool is cartridge-powered, portable, ready to work *anywhere*. Forty styles and lengths of Remington Studs to choose from. Get full details by mailing coupon.

Remington
DUPONT
STUD DRIVER

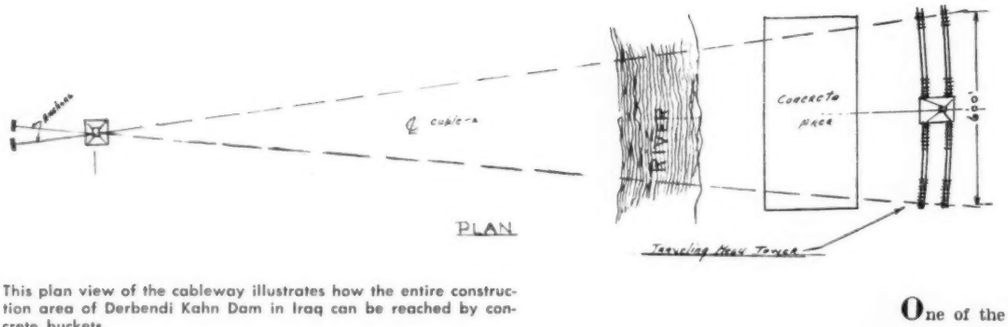
Industrial Sales Division, Dept. CE-2
Remington Arms Company, Inc.
Bridgeport 2, Conn.

Please send me your free booklet which shows how I can speed the job and save with the Stud Driver.

*Name*_____ *Position*_____
*Firm*_____
*Address*_____
*City*_____ *State*_____

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 255

Planning traveling cableway for concrete and earth dam



This plan view of the cableway illustrates how the entire construction area of Derbendi Kahn Dam in Iraq can be reached by concrete buckets.

One of the first steps in planning construction operations for Derbendi Khan Dam in Iraq was the design of a traveling cableway to be used in delivering concrete and other necessary material and equipment as efficiently as possible.

The dam is part of a $119,000,000 industrialization program undertaken by the government of Iraq to develop the resources of the country and to raise the living standards of its people. It is located 145 miles northeast of Baghdad on the Diyala Sirwan river.

Work is just about getting under way on the dam which, when completed, will be 1,098.8 feet long, and 416.6 feet high from base to crest. It will require 8,500,000 cubic yards of earth and rock fill, and 346,000 cubic yards of concrete. The completed dam project will cost an estimated $32,200,000, and will require 1,000 working days for its construction. It is being built by a joint-venture of four contractors: J. A. Jones Construction Co., Charlotte, N. C., the managing sponsor; C. H. Tomkins Co., Washington, D. C.; Tecon Corp. of Dallas, Texas; and Beton-und-Monierbau A G of Dusseldorf, Germany.

According to the Leschen Wire Rope Division of H. K. Porter Company, Inc., which is supplying the main ropes for the traveling cableway and also the operating ropes, this high-wire system will permit the placing of a load of concrete at any point desired within the construction area. One end of the main track cables is attached to the stationary tail tower. The other end is held by the head tower which is mounted on tracks so it can be moved to any desired point within 600 feet parallel to the river. Since the head tower, obviously, cannot be guyed to anchors, it is very heavily weighted on its far side so that it can hold the weight and tension of the cableway system, plus a 20-ton load.

38.4 tons of rope

Leschen supplied 76,800 pounds of wire rope for the construction of the dam, including the main track rope of the cableway system which is a 2,300-foot length of 3-inch-diameter special Hercules Red Strand cableway rope. It weighs over 40,000 pounds, and is equipped with bridge sockets at each end weighing 1,000 pounds each. The other six ropes in-

FOR

Steadier Arc

Steadier Voltage

Smoother, Faster Application

USE

VICTOR

Automatic Rods

Victor automatic hardfacing alloys go on 3 to 4 times faster than manually-applied hardfacing, enable you to make big savings in labor costs. And if you're repairing equipment, cutting down time by ⅔ or ¾ likewise is a terrific saving. You get a more uniform deposit, too, from Victor automatic hardfacing alloys, resulting in longer, more even wear. Check this chart — you'll find there's a Victor type for every hardfacing need.

Learn for yourself how hardfacing with Victor automatic rod reduces labor and repair down time. Ask your Victor dealer for Bulletin 358—or better yet, order a coil of rod NOW and try it on your job.

PROFITABLE DEALERSHIPS OPEN; INQUIRE NOW!

33

VICTOR EQUIPMENT COMPANY

ALLOY ROD AND METAL DIVISION

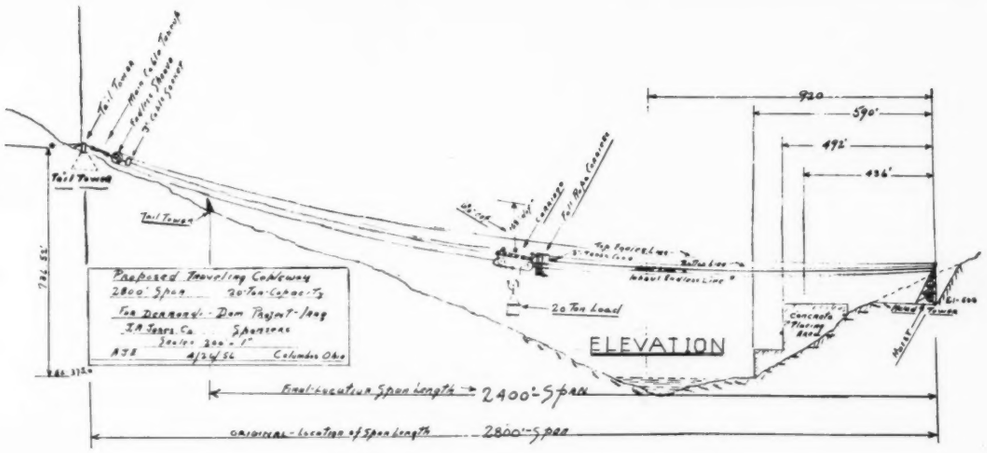
Los Angeles 59, California • Wakita, Oklahoma

Note even deposit of Victor VA#3 automatic rod on gyratory crusher cones.

TYPE	USES	PROPERTIES AND APPLICATION
VA#1	Crusher Rolls Gyratory Crushers Crusher Mantels Scraper Blades	Rockwell 'C' 54-57 Impact Resistance—good Abrasion Resistance—high AC-DC submerged arc or DC open arc
VA#2	Pinch Rolls Tractor Idlers Tool Joints Coiler Rolls	Rockwell 'C' 50-52 Impact Resistance—good Abrasion Resistance—good Submerged arc only Suitable for multiple passes
VA#3	Roll Crushers Gyratory Crushers Impellors Mill Guides	Rockwell 'C' 54-57 Impact Resistance—good Abrasion Resistance—high For use where abrasion is severe Submerged arc only
VA#4	Tractor Rollers Sheave Wheels Tractor Idlers	Rockwell 'C' 25-28 Impact Resistance—excellent Abrasion Resistance—good Submerged arc only Suitable for multiple passes Machineable
VA#5	Tractor Rollers Sheave Wheels Tractor Idlers Grader Blades	Rockwell 'C' 34-38 Impact Resistance—high Abrasion Resistance—good Suitable for multiple passes Submerged arc only
VA#6	Crane Wheels Roll Necks Pump Sleeves	Rockwell 'C' 38-41 Impact Resistance—high Abrasion Resistance—fair Suitable for multiple passes Deposit machineable Submerged arc only
VA#7	Excellent base for high alloy application. Mine Car Wheels	Rockwell 'C' 36-42 Impact Resistance—excellent Abrasion Resistance—good Suitable for multiple passes Deposit machineable Submerged arc only
VA#8	Tool Joints Grader Blades Scraper Blades Roll Crushers	Rockwell 'C' 51-54 Impact Resistance—high Abrasion Resistance—high Submerged arc only
VT#60	Tool Joints Grader Blades Scraper Blades	Automatic Tungsten carbide wire Abrasion Resistance—excellent (maximum) Deposits are heterogeneous Open arc—DC reverse only

Rod diameters 1/8", 5/32" and 3/16". Standard coil size, 22-1/2" inside diameter, 4" wide, approximate weight 100 lbs.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 256



The elevation view of the cableway system and its operating ropes. A total of 76,800 pounds of wire rope was supplied by Leschen Wire Rope Division of H. K. Porter Co., Inc., for this installation.

cluded in the shipment are operating ropes, three for initial use and three to be held as replacements.

Each of the three operating ropes performs a specific function in the cableway operation. For example, the rope known as the endless line, which is 1-inch diameter and 5,170 feet long, is reeved in the system with one end attached to each end of the carriage. This carriage is supported and guided by the 3-inch-diameter track rope. By means of this endless rope, the carriage is moved along the track rope and positioned for concrete placing or the setting of forms.

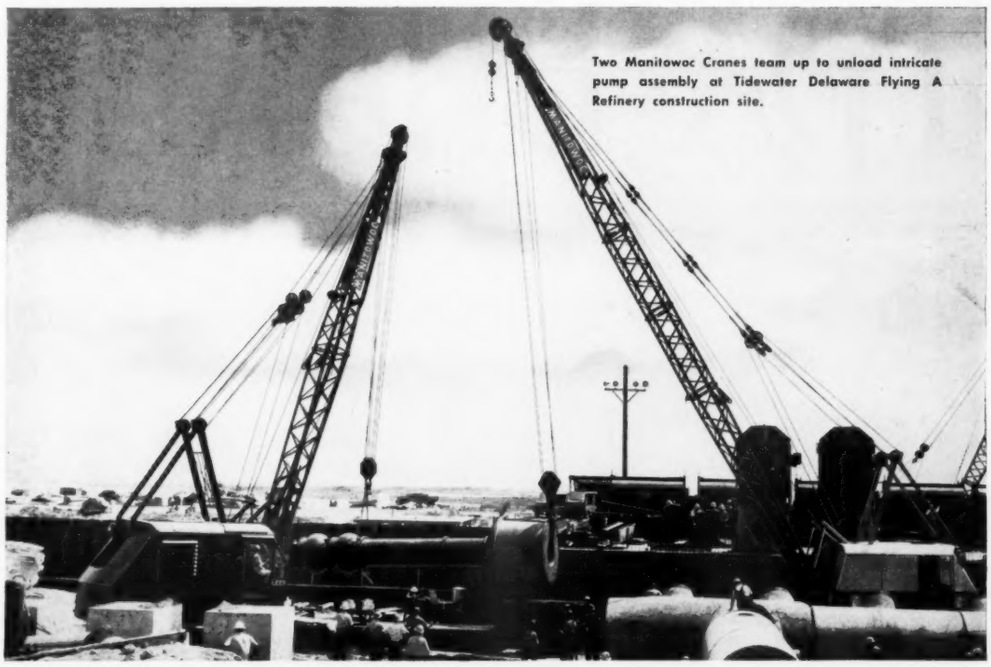
Suspended beneath the carriage by an operating rope, known as the hoist line or load line, is a 4-yard bucket for placing concrete. Vertical positioning of the bucket is accomplished by means of the ⅞-inch-diameter hoist line, 3,300 feet long.

The third operating rope, ¾-inch diameter and 2,550 feet long, is known as the button line. This rope supports and positions carriers which, in turn, limit the sag of the other operating ropes. THE END

Technical training of high school students

State Highway Commissioner William Poeter has conferred with the Department of Education of Vermont concerning the establishment of a two-year highway technological course in the Vermont School of Agriculture at Randolph. Students enrolled in the technology program would attend classes for three or four months, and then work in the Highway Department as paid classified state employees for the same length of time. Graduates would be given permanent positions in the department upon attaining a minimum scholastic and field rating.

Alfred W. Lane, Special Assignments Engineer in the Highway Department, and John E. Nelson, Director of Vocational Education for the Education Department, are now making a survey of the subject. The Personnel Department is giving consideration to a special engineering classification for graduates of such a technical course. The Highway Department now has about 100 vacancies that could be filled by properly trained high school graduates. These young men with technical training would have jobs with a minimum of twenty years potential duration.



Two Manitowoc Cranes team up to unload intricate pump assembly at Tidewater Delaware Flying A Refinery construction site.

24 Manitowoc Cranes Help Raise Giant Tidewater Oil Refinery

A total of 24 Manitowoc Cranes is working on the erection of the huge new Tidewater Oil Company Delaware Flying A Refinery near Delaware City, Del. Covering 5000 acres, the ultra-modern refinery will be the biggest built at one time as a single unit, with an expected throughput of 130,000 barrels of oil per day.

C. F. Braun and Co., Alhambra, Calif., designers and engineers for the project, is also handling actual construction of the refinery. The Braun Co. is using 22 Manitowoc crawler cranes, and two Manitowoc Mobile Cranes, units ranging in capacity from 40 to 80 tons, with booms 60 to 120 feet long.

A tremendous variety of jobs are handled by the Manitowocs. Some of the work includes: unloading freight cars, stacking incoming materials, transporting machinery to the construction site, pouring concrete, erecting scaffolding and rigging poles, setting steel, erecting 250 miles of elevated pipeline, laying underground conduits and setting high velocity water pumps on foundations.

Machine downtime on the Tidewater project has been negligible, with no holdup of work due to breakdowns . . . a real testimonial to the ruggedness and solid engineering for which Manitowoc cranes are famous!

Your Manitowoc Distributor will be glad to supply all the details on Manitowoc's versatile line of cranes and excavators — call him today!

MANITOWOC ENGINEERING CORP.,
MANITOWOC, WIS.

What the Men on the Job Think of Their Manitowocs!

"For steel erection you can't beat Manitowoc. One of the finest machines on the market." Don Rossillo, Crane Operator

"The 2800 is the best motor crane on rubber that was ever made. It will pick up 20 tons without an outrigger and walk away with it." Jack Streets, Ironworker's Foreman

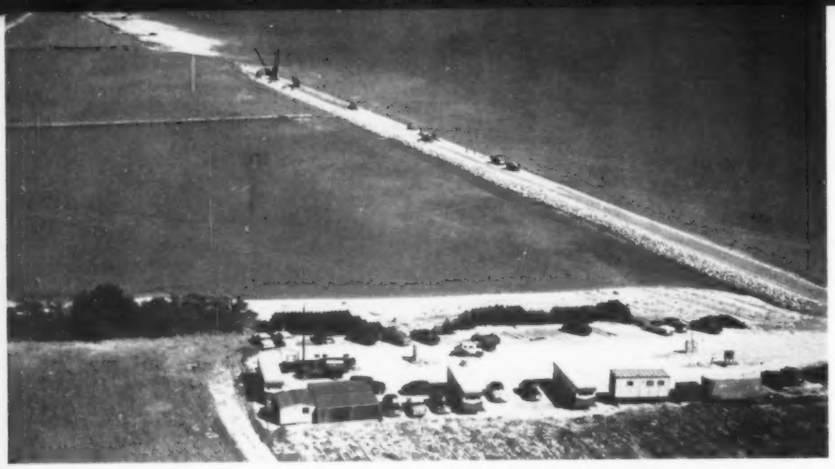
"For hooking rigs, setting steel, or pouring concrete, Manitowocs can't be beat. And they stand up very well. Been working here an 8 hour day, 5 day week for about ten months and have never been down a minute for repairs." R. L. Slater, Operator

"This mobile model 2800 is one of the best cranes for all-purpose work. They are strong and smooth running, both on the hoisting and the travelling on the road. Best machine I ever ran, truck or cat." Prince A. Congleton, Operator

"Sturdiest truck crane on the market, and I've run them all." Harry Racine, Operator

MANITOWOC
SHOVELS 1-5½ YD. Speedcrane CRANES 20-100 TON

For more facts, use Reader-Reply Card opposite page 18 and circle No. 257



A completed section of the 10,000-foot-long west levee juts out from the site of the contractor's trailer-office setup. Further out, a combination floating and land line pumps material to plus 5 feet elevation.

Dredges build up unique disposal area for harbor waste

Two dredges are pumping an average of 18,000 cubic yards of hydraulic fill per day for the 6-mile levee that will totally enclose the Craney Island disposal area near Norfolk Harbor, Virginia, by March.

This unusual project, requiring about six million cubic yards of fill, will then provide a 2,500-acre area capable of retaining about 96,500,000 cubic yards of waste material dredged from the channels and berths in the Portsmouth-Norfolk-Newport News area around the harbor.

Located in the Craney Island flats just north of Craney Island and west of the Norfolk Harbor's 40-foot channel, the disposal area will be fed from rehandling basins between the channel and eastern levee. A per-cubic-yard toll charge for rehandling material dredged under private or public auspices will cover expenditures for the construction, operation, and maintenance of the area.

The need for such a facility has been evident for a long time. All available shore and deep-water areas in Hampton Roads and lower Chesapeake Bay have been exhausted, and the current practice is for bucket dredges to load scows that are hauled —at an almost prohibitive cost— about 55 miles out to sea or to an area in Chesapeake Bay, opposite Cape Charles City, to dispose of the material.

The average hopper dredges used to maintain the channels and berths in the harbor area are able to excavate about 3,000 cubic yards of material in 45 minutes, but more than seven hours is required for the round trip between the dumping grounds and Hampton Roads.

When the new disposal area is completed in March—almost three years from the start of work—this expensive and time-consuming operation will be eliminated. Then, no bucket or hopper dredge operating in the Hampton Roads area will be more than one hour from the rehandling basin. Savings to all users will be enormous. The U. S. Army Corps of Engineers, for example, which dredges about three million cubic yards of material in the harbor annually, will be able to do the same amount of work for less money or else expand its operations in the harbor considerably.

Pump hydraulic fill

The $4,350,000 levee job is being

TDA® BRAKES

NEW TIMKEN® DLM BRAKE

offers Versatility...Flexibility...Dependability!

The revolutionary DLM brake will serve effectively with a variety of equipment. It has already proved its value as a control or parking brake, and is used in various sizes on trucks, busses, machinery, farm equipment, cranes, shovels, hoists, golf buggies, lift trucks.

Highly Efficient! The DLM brake is basically a self-energizing two-shoe brake in which both shoes do the same amount of work—give equal forward and reverse torque output, regardless of drum rotation.

Simpler! Only 8 parts, with interchangeable shoes and springs. Lubrication is not required. No internal adjustment necessary. Enclosed design guards against entrance of foreign matter and requires only a minimum of maintenance.

Lighter! More Payload Advantages! Improved TDA design using lightweight fabricated steel shoes and brake supports saves many pounds over heavier, more costly brakes.

©1956, RS&A Company

For every industrial, agricultural or automotive application where braking is required!

TIMKEN Detroit BRAKES
ROCKWELL SPRING AND AXLE COMPANY
Accepted TDA Standard

TDA Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

Timken-Detroit Brake Division
Rockwell Spring & Axle Company
Dept. C&E-27, Ashtabula, Ohio

Please send me further information on your "DLM" Brake.

Name ..... POSITION

Company .....

Address .....

City ..... State .....

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 258

More than 6 million yards of hydraulic fill go into levees enclosing the site for waste taken from harbor channels, berths

by ANTHONY N. MAVROUDIS,
field editor

A Cat tractor uses a side boom to position a 16-foot section that will be added to one of the branches of the double 22-inch discharge line on the levee. A valve will close the line while the section is added.

done by 18 and 22-inch hydraulic dredges, which are averaging 8,000 and 10,000 yards of fill per 20-hour day, respectively. Norfolk Dredging Co., Norfolk, Va., started the work with the Florida, the largest of the two dredges, which began pumping operations from a huge borrow area just outside the 10,000-foot-long west levee. This dredge extended the levee about 14,000 feet out into the water before changing its position.

Two other borrow areas, located inside the disposal area, supplied the fill needed to complete the levee. The hydraulic fill—most of it taken from old oyster beds—consisted of a mixture of sand, shell, and rock. It was pumped to an elevation of plus 5 feet, measured from mean low water. This required a 15-foot fill since the water was about 10 feet deep. The fill, placed in two stages, went directly onto the undisturbed harbor bed, which generally consists of an 80 to 90-foot stratum of silty clay. A swinging line was first used to bring the fill to an elevation of minus 5 feet. A baffle at the discharge end of the line spread the material to a width of about 400 feet. Then a land line, supported on fill, pumped the material up to the required height.

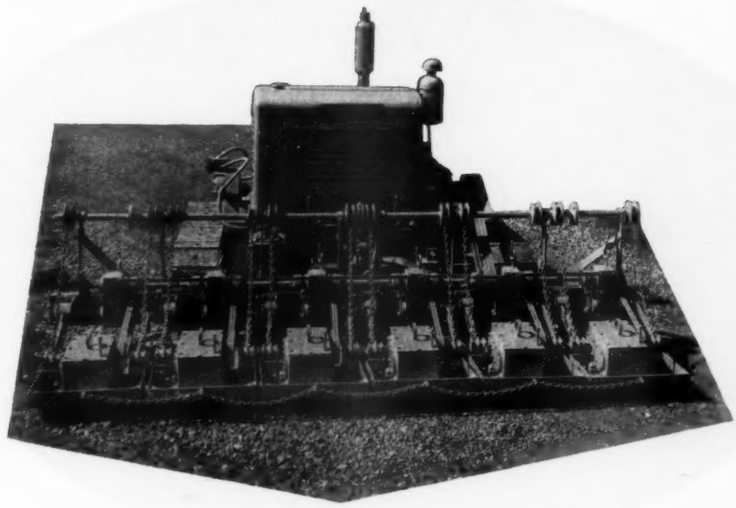
The secondary stage of levee construction was handled by two 22-inch-diameter branch lines fed by the main discharge line of the dredge. These branches were strung along the levee fill already placed, and as the fill was pushed out from the shoreline, 16-foot-long pipe sections were joined to the branches with telescopic connections.

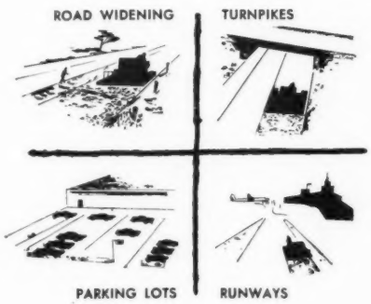
Two valves, installed in each branch at the junction with the main line, were used to cut either branch in or out whenever a side of the levee had to be equalized. These two branches, kept about 30 feet apart, generally straddled the centerline of the levee. A Caterpillar D6 and an International TD-4 equipped with side booms helped shape the hydraulic fill, move the discharge line, and add sections to the line.

The floating lines connecting the dredge with the land line on the levee were made of 50-foot lengths with ball-joint connections. Steel cylinder pontoons, 42 and 60 inches in diameter, and with lengths of 30 and 28 feet, respectively, were used as supports for the floating lines. These

(*Continued on next page*)

YOU'RE GUARANTEED "REQUIRED" DENSITY WITH FASTEST COMPACTION*





the NEW 1957 VIBRO-TAMPER

...one lift sub-base and base course compaction to 95% and better modified Proctor oftentimes in one pass. Vibro-Tamper gives you this at speeds that enable V-T compaction to keep up with your spreader.

Why?... because Vibro-Tamper is engineered exclusively on the power dynamics of vibratory compaction pioneered by International Vibration and Rutgers University.

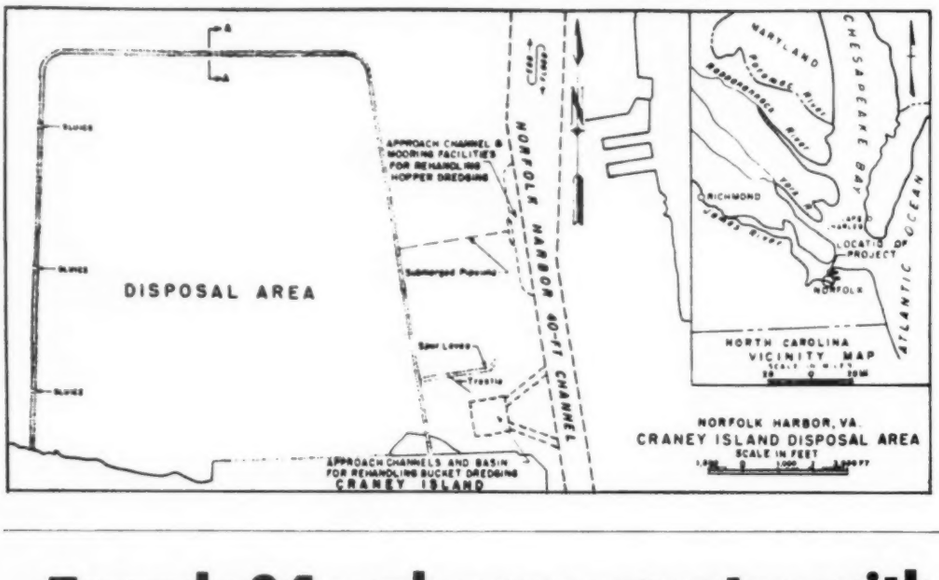
* International Vibration Company guarantees single-course compaction to required density and the mechanical performance of each Vibro-Tamper. See your equipment dealer for express warranty.

HOW TO SAVE COMPACTION TIME... AND ELIMINATE REHANDLING... REQUEST V-T 6-4 BULLETIN

*See your Vibro-Tamper dealer for express warranty.

THE INTERNATIONAL VIBRATION CO.
16701 WATERLOO ROAD IVanhoe 6-0680 CLEVELAND 10, OHIO

For more facts, use Reader-Reply Card opposite page 18 and circle No. 259



The 2,500-acre Craney Island disposal area, capable of retaining about 96,500,000 cubic yards of waste, will have a total of 15,000 feet of shore line on the levees so that material can be deposited anywhere at the site.

(*Continued from preceding page*)

pontoons were placed about 12 feet from the ends of the 50-foot pipe lengths.

After the hydraulic fill had been pumped into place, test borings were made at 200-foot intervals along the levee so that the percentage of material passing the No. 200 sieve could be determined. A maximum limit of 20 per cent passing was required. If this limit were exceeded by a portion of the fill, the section had to be removed and replaced with satisfactory material.

The Florida, from its new position in the borrow area inside the disposal site, used the same methods to complete the 10,000-foot-long northern levee and a major part of the 10,000-foot-long east levee. This work required a discharge line 17,500 feet long and an auxiliary Ellicott booster pump to push the fill material for this distance.

While the west levee was being constructed, the contractor was pumping up the other end of the 10,000-foot-long east levee with the 18-inch dredge Talcott. This dredge, located within the disposal area, also used the swinging floating line first, then switched to a land-line with a twin-branch discharge for a distance of about 6,000 feet from shore.

In placing hydraulic fill at the corner of the levee, the contractor used about 10,000 feet of submerged line, which was protected against the rough weather that could snap a line of this length quite easily.

The Florida

The 22-inch dredge Florida averaged about a thousand linear feet of levee throughout the project. Originally a steam-operated dredge, it now has a 3,200-hp diesel driving the pump and a 500-hp diesel on the cutter. Its over-all length, including the length of the ladder, is 180 feet, and it has a maximum digging depth of 42 feet.

On this job, the average depth of the cuts is being held at 4 to 5 feet along a maximum 250-foot-long swing arc. A floating derrick is handling the positioning of the swing anchors and the placing of pipe sections. The two 60-foot-long, 30-inch-diameter steel spuds keep the dredge moving forward as the floating derrick repositions the anchors. A 75,000-gallon fuel barge and a 100,000-gallon water barge supply the dredge. A 15-man crew is being used per 8-hour shift, and a total of 45 are quartered on the dredge for round-the-clock operations.

Aside from the sieve analysis, a density test is being made to make

Travels 24 mph cross-country with 20 cubic yard payload

TIMKEN® bearings keep it rolling

THIS is International Harvester's Model 75 Payscraper. It can travel cross-country at 24 MPH with a 20 cubic yard payload. One of the ways International Harvester assures long life in spite of the most difficult jobs is by mounting vital parts on Timken® tapered roller bearings.

In the tractor's differential and on its pinion shaft and engine shaft, Timken bearings insure accurate gear meshing. That's because the tapered design of Timken bearings lets them take radial and thrust loads in any combination. Shaft alignment is insured. There's always a smooth flow of power.

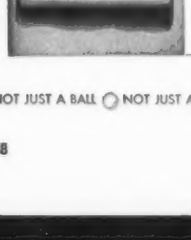
Full line contact between rollers and races of Timken bearings provides the extra load-carrying capacity they need to handle extra-heavy loads. And because Timken bearings keep housings and shafts concentric, they make closures more effective. Lubricant stays in—dirt stays out.

Timken bearings also keep maintenance low. One reason: they're designed by geometrical law to have true rolling motion and made with extreme accuracy to provide the low friction this design makes possible. To insure the highest quality steel, we make our own. We're America's only bearing maker that does.

Make sure the equipment you buy or build has Timken bearings. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

How **INTERNATIONAL HARVESTER** mounts pinion and differential of its Model 75 Payscraper on Timken bearings for less friction, longer life, minimum maintenance.



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. Timken fine alloy steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST —◫— LOADS OR ANY COMBINATION

For more facts, use Reader-Reply Card opposite page 18 and circle No. 260

The 22-inch dredge Florida.

A job-built skip pan is tilted and jerked backward so that riprap is placed in uniform layers. The Lima dragline is excavating a side trench.

sure the revetment has a 97 per cent density before riprap is placed. The base of the levee averages 800 feet in width and it tapers on a 1 on 30 slope to an elevation of minus 2 feet. From this point to plus 5 feet at centerline, the hydraulic fill is formed on a 1 on 15 slope.

Before riprap is placed, side trenches are excavated about 25 feet from the centerline of the levee on the interior side of the levee. The outside trench is about 35 feet from the centerline. This excavation, handled by dragline, is required so that the inside of the levee can be built up to a 1 on 2 slope and the outside to a 1 on 2½ slope. Excavated material was used to build the 22-foot-wide roadway base, which has a surface elevation of plus 8 feet.

Rock for the riprap and for the roadway wearing surface is being hauled to the site in rail cars and stockpiled in various sizes. The largest particles, classified type B, average 600 to 800 pounds each; type A stone averages 100 pounds each. Another stockpile consists of crushed road stone with 3 to 6-inch particles classified as type I. Other stockpiles for various types of building material and screenings for the road surface are also maintained.

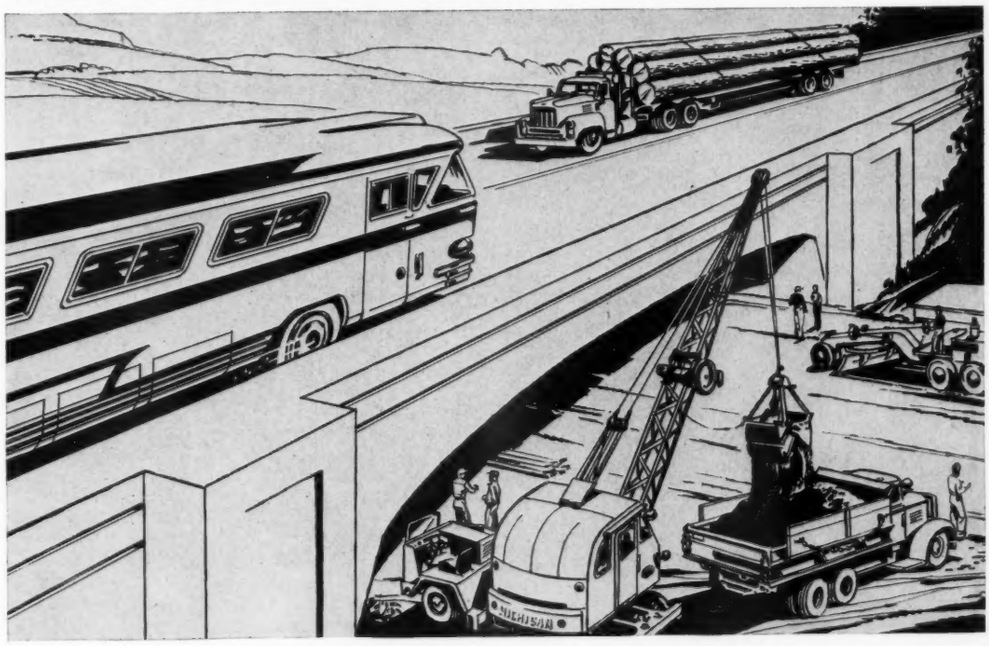
Type A and B riprap is furnished by the Buggs Island quarry near South Hill, Va., while Trego Stone Corp., Emporia, Va., is supplying type I and 6-inch crusher-run bedding stone. The 2-inch-minus riprap bedding material is shipped from Southern Materials Co., Inc., Hopewell, Va.

On the inside 1 on 2 slope of the levee, a 9-inch blanket of the 6-inch crusher-run stone is placed and topped with a 12-inch layer of type A riprap. The outside 1 on 2½ slope is built up with a 9-inch blanket of 2-inch-minus bedding, a 9-inch layer of type 1 crushed stone, and a 24-inch thickness of type B riprap. Type I stone, with 3 to 6-inch particles, was placed in an 8-inch layer to form the 22-foot roadway. This layer was choked with stone screenings. A Koehring crane equipped with an orange-peel bucket loads the stone from stockpiles to a fleet of dump trucks hauling to the levees.

The job of placing the riprap, kept at least 1,500 feet behind the end of hydraulic fill operations, is handled by a contractor-built skip-pan, 9 feet wide, 11 feet long, and 18 inches deep, which is supported by a crane. Trucks dumped stone directly into the skip-pan, which is capable of placing the small-size stone in uniform layers and of handling the large-size stone almost individually. This rig is responsible for cutting down rehandling

(*Continued on next page*)

Important Announcement by Clark Equipment



. . . A New CLARK 5-Speed Synchronized Transmission

Here's news vital to operators and builders of heavy-duty equipment—trucks, coaches, crane-shovels, construction machinery.

This latest engineering triumph from power-train headquarters is entirely new in every detail; and is equipped with the Clark Split-Pin Synchronizer—proved dependable by millions of miles of heavy-duty operation

Two basic models—both 5-speed, synchronized in 2nd, 3rd, 4th, 5th

300 V—Nominal torque rating 350 lbs-ft
400 V—Nominal torque rating 450 lbs-ft

For full information mail your inquiry to Clark Equipment Company, Transmission Division, Jackson 27, Michigan.

Transmission Division
CLARK EQUIPMENT COMPANY
Falahee Road
Jackson 7, Michigan

CLARK® EQUIPMENT

For more facts, use Reader-Reply Card opposite page 18 and circle No. 261

This turntable, built from plans furnished by Blaw-Knox, turns trucks hauling riprap to the skip pan, eliminating the time-consuming maneuvering that would otherwise be necessary on the 22-foot-wide roadway.

(Continued from preceding page)

time, especially during the placing of the large-size riprap.

This flat-bottom skip, capable of holding a full truck load of large stone or two loads of smaller-size stone, has an experienced operator placing the rock in uniform layers. The operator is able to tilt the forward dumping edge of the skip and, by a quick, backward jerking motion, cause the rock to fall into place on the levee. After developing this technique, the operator was almost able to place some of the type B riprap stone by stone.

Another time-saver is a turntable, powered by a Le Roi 25-hp gasoline motor, that was built by the contractor from plans furnished by Blaw-Knox. This turntable is moved along the levee behind the crane. It turns the haul trucks 180 degrees on the 22-foot-wide roadway so that they can just back up a short distance and dump rock into the skip pan. Once the trucks have dumped, they are able to drive swiftly off the levee. As one haul truck drives away, another is able to back from the turntable to the skip. If the turntable had not been used, the second truck would have to wait, since it would be blocked while the first truck turns around.

Three 64-foot-long timber sluiceways were built into the west levee, which can be closed with flashboards when material is being pumped into the disposal area and opened after the spoil has been given a chance to settle. The level of the water in the disposal area can also be lowered by the removal of the 12-inch flashboards from the sluices. These sluiceways also support the 22-foot-wide roadway, which consists of timber planking supported on timber piling.

Rehandling basins

A rehandling basin between the east levee and the 40-foot channel in Norfolk Harbor is being built under another contract. When spoil material, dumped into the basin by dipper dredges reaches a certain level, a hydraulic dredge will be hooked into the rehandling basin and the material pumped from the basin to the disposal area. About 255,000 cubic yards of material will have to be dredged from approach channels running from the Norfolk channel to this basin, and an additional 1,800,000 cubic yards will have to be dredged from the rehandling basin.

Hopper dredges will not use the rehandling basin at all. Material will be pumped directly from hopper dredges, through a moored rehandling dredge, to the disposal area. A channel from the Norfolk Harbor 40-foot channel and mooring dolphins will be provided for this pumping procedure.

Material pumped from the rehandling dredges or directly from hopper barges will be discharged at any desired point in the disposal area through some of the 15,000 feet of shore line that runs on the levees. The roadway on the levees will provide access to any part of the area so that maintenance work can be done and pipeline sections moved from one part of the levee to another.

The estimated life of the disposal area is about 22 years, based on an annual deposit of 4,300,000 cubic yards of material. This figure is based on the average dredging work from 1932 to 1952, and allowance has been made for projects planned for this area. By the late 1980's, about 2,500 acres of government-owned waterfront property will be available, but

POWER Aplenty

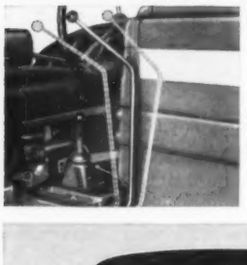
for MANY JOBS...at NEW LOW COSTS

JOHN DEERE
Crawler Tractor

Compact, powerful, and low in first cost, the "420" Crawler is built to deliver years of dependable service at very low cost per hour. Ruggedly built. Easy to start. About 30 engine horsepower. Fewer parts to wear, easily serviced, very low fuel consumption. Your choice of 4- or 5-roller frame . . . track shoes to fit your needs. Optional equipment includes smooth, fast-working single or double hydraulic system, direction reverser, new 3-point hitch for rear-mounted equipment, and 5-speed transmission. Wide choice of matched working equipment for nearly all jobs, including John Deere Loader, at left.

JOHN DEERE
Utility Tractor

This wheel-type, stay-on-the-job power unit can boost your profit margin on many kinds of work. Low in first cost, low in upkeep, remarkably low in fuel costs. Cuts "down time" to a minimum because of simple, rugged construction. Highly maneuverable. Has unusual stability when carrying loader, backhoe, or similar equipment. Built low—easy to get on and off, sure-footed on slopes. Optional equipment includes direction reverser, 5-speed transmission, and power-adjusted rear wheels. Shown with loader and backhoe. 3-point hitch regular.



DIRECTION REVERSER
. . . a Real Time-Saver

Optional for Crawler and Utility tractors. Lets you move forward or backward in same speed without shifting gears. Investigate—you can save as much as an hour a day in travel time on loading, dozing, and many other jobs!

. . . Now Ready for You!

Some of the Equipment Available

Loaders	Scrapers	Sweeper	Seeders
Scarifiers	Trenchers	Crane	Scoop
Backhoes	Generator	Snow Plows	Fork Lift
Dozers	Pump	Sprayers	Power Saw
Cutter-Bar Mower		Cement Mixer	Gang Mower

JOHN DEERE Industrial Tractors and Equipment

Backed by nearly 40 years of tractor manufacture for dependable service and quality.

SEND FOR FREE LITERATURE

John Deere Industrial Division, Moline, Ill., Dept. D20G

Please send me your illustrated booklet on John Deere Industrial Tractors and Working Equipment. Include name of nearest dealer.

Name_____

Title_____

Address_____

City & State_____

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 262

Offices of the contractor and resident engineer are in these Contractors Trailer Co. trailers, located between the east and west levees of the disposal area.

whether it will be retained by the government or sold to private interests still remains undecided.

Personnel

This project was designed and is being constructed under the direction of the Norfolk District, U. S. Army Corps of Engineers. The district engineer is Col. Oliver J. Pickard. C. J. Robin is chief of the engineering division; E. K. Jackson is chief of the operations division; George M. Parker is chief of the Rivers and Harbors Branch; and Harry G. Moore is resident engineer.

General supervision for the Norfolk Dredging Co. is being exercised by A. Lee Smith. A. A. Puckett was superintendent for the Jackson-Ritter Co., subcontractor on the revetment construction and stone protection work.

THE END

Semi-automatic welder

■ A new brochure on the AMSCO semi-automatic welder for hardfacing is available from the American Manganese Steel Division of the American Brake Shoe Co. The brochure contains cross-sectional and cutaway drawings of the AMSCO "MF" welder and its component parts, and explains in detail the operation of the machine.

Also included in the brochure is a section on the new AMSCO tubular electrodes for semi-automatic manganese steel build-up and hardfacing.

To obtain Bulletin No. 6-56 write to the American Manganese Steel Division, Dept. A, 395 E. 14th St., Chicago Heights, Ill., or use the Request Card at page 18. Circle No. 7.

Ladder-type trencher

■ A new catalog describing the improved Model 155 Trenchliner is available from the Parsons Co. The ladder-type machine can dig to a depth of 10 feet in widths of from 16 to 26 inches. Its digging capacity has been increased 25 per cent.

Photographs and drawings are incorporated into the catalog to describe the principal construction and application features of the machine in general utility work. Other features, such as the telescopic boom's hydraulic hoist, the power shaft and reversible spoil conveyor, the reversible and self-cleaning Tap-In bucket teeth, and the self-cleaning tractor-type crawlers, are also detailed.

To obtain this catalog write to the Parsons Co., Box 431, Newton, Iowa, or use the Request Card at page 18. Circle No. 13.

Threadless fastener

■ A threadless metal fastener that is secured to a smooth rod by means of internal wedges is described in a bulletin from the Morrow Mfg. Co. The Wedgnut consists of an internally-coned shell that contains two tapered wedges, and a cap that keeps the two wedges in the shell.

When slipped onto a threadless rod, rows of teeth on the wedges abrade the rod with a point of contact penetration that reportedly will never slip. The units are available in diameters of ¼, ⅜, and ½ inch.

The bulletin describes the new fastener in detail, shows it in cross section, and pictures several applications.

To obtain this bulletin write to the Morrow Mfg. Co., RFD #1, Old Baptist Road, East Greenwich, R. I., or use the Request Card at page 18. Circle No. 17.

Drilling equipment

■ A catalog from Brunner & Lay, Inc., features the company's carbide Rok-Bits, drill steels, and such pneumatic tool accessories as moil points, sabur points, clay spades, and asphalt cutters. Pictures and complete specifications are given for each product, along with suggestions for obtaining the best drilling results with the carbide Rok-Bits.

To obtain Catalog No. 756 write to Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill., or use the Request card on page 18. Circle No. 10.

"They're making 20% more trips a day than our other trucks working the Lincoln Tunnel job"

HUSTLING 6½ YARD LOADS (60,000-LB. GROSS) FOR THIS NEW NEW YORK-TO-NEW JERSEY LINK, Hudson Builders' new GMC W670 tandems have amazed their owner. "On hills where other trucks just manage to crawl, these GMC's *really roll*," owner Harry Harris reports. "Our 70-truck fleet was formerly standardized on another make. But the GMC's top all the others — by plenty. You can be sure we're going to get more of them. And soon, too!"

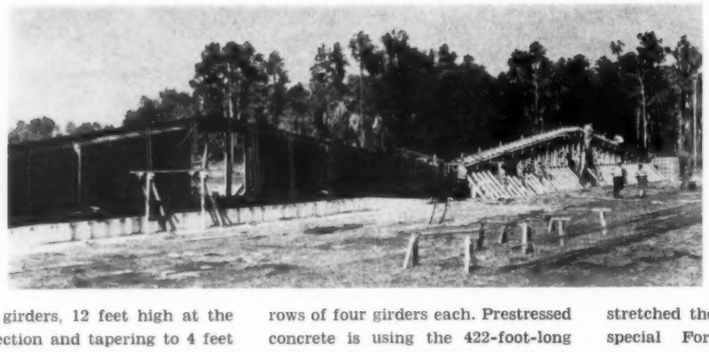
AS QUICK AND RESPONSIVE IN OFF-THE-ROAD WORK as they are over the highways, these GMC's save time at every delivery. Big 225 H.P. engine gives them power to breeze through tough going. Safety Power Steering* makes at-the-job maneuvering faster and easier—lets you ease right up to the edge of excavations and foundations. And the W670 is only one of the new GMC construction haulers engineered for *any* job up to 59,000 GVW-90,000 GCW.

*Optional at extra cost

GMC TRUCK & COACH
A General Motors Division

For more facts, use Reader-Reply card opposite page 18 and circle No. 263

Big girders turned out at rate of one a day for triple warehouse



Crews position the special Form-Crete forms for the big girders being cast for a new warehouse by Prestressed Concrete Inc., Lakeland, Fla.

Mass production techniques are making it possible for Prestressed Concrete, Inc., Lakeland, Fla., to send a 101-foot 6-inch-long girder every day to the American Cyanamid plant in Brewster, Fla., where a triple phosphate storage warehouse is being built.

These girders, 12 feet high at the center section and tapering to 4 feet at the ends, have a top slab width of 3 feet. Each weighs 71 tons, which includes 2½ tons of prestressing wire and reinforcing steel, and requires 36 yards of concrete.

The girders are being cast in two rows of four girders each. Prestressed concrete is using the 422-foot-long casting bed for the work, a bed with end abutments capable of withstanding a 2-million-pound horizontal thrust.

As soon as the two sets of wire—48 strands for each set—have been stretched the length of four girders, special Form-Crete steel casting forms, supplied by the Florida Division Food Machinery & Chemical Corp., Lakeland, are set in place. Concrete going into the girders is a standard 6,000 psi mix which is cured to 4,200 psi.

After the concrete has set up, one side of the forms is removed and placed in position for the second girder, while the other side is set in place for the third girder. This procedure was continued down one side of the bed, then the other, until all eight girders had been cast. By the time the last girder had been cast, the first line of four had cured so that the wires could be cut.

During prestressing, a tension of 900,000 pounds was placed on the wires to produce a ⅝-inch camber in the center of the girders. After 20 tons of dead load are placed on each girder when the warehouse is completed, this ⅝-inch camber will be reduced so that the girders will be in a neutral position.

GOOD COMMUNITY RELATIONS

... because of "good-will" methods and techniques in blasting

Modern blasting presents many problems to the roadbuilder and quarry operator. In addition to doing the job efficiently, he must take the utmost care and consideration to avoid disrupting the business and family life of the community.

To help you increase your standing as a good neighbor and build your professional prestige in the communities where you operate, American Cyanamid Company's engineers have developed blasting procedures that we call "Good-Will" techniques. These techniques can help you reduce noise, vibration and shock to a minimum. At the same time, they enable you to obtain maximum blasting efficiency.

American Cyanamid's trained engineers will be glad to assist you in the selection and most efficient use of our high-grade blasting materials. Their skilled advice and knowledge of all types of blasting are among the many services Cyanamid provides for its customers.

We can give you quick delivery, direct to your location, from our conveniently located plants and magazines. We are always ready to assist you with your unusual blasting problems.

THE AMERICAN CYANAMID LINE:

High Explosives — Electric Blasting Caps
Permissibles — Instantaneous
Blasting Powder — Regular Delay
Blasting Caps — Split-Second Delay
Blasting Accessories

CYANAMID

AMERICAN CYANAMID COMPANY
EXPLOSIVES DEPARTMENT
30 Rockefeller Plaza, New York 20, N. Y.

Sales Offices: New York City, Latrobe, Pa., Pottsville, Pa., Scranton, Pa., St. Louis, Mo., Bluefield, W. Va.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 264

Booklet aids contractors seeking work for Army

Contractors hoping to land a research and development contract with the U. S. Army will welcome the "how to" booklet recently released by the Department of the Army.

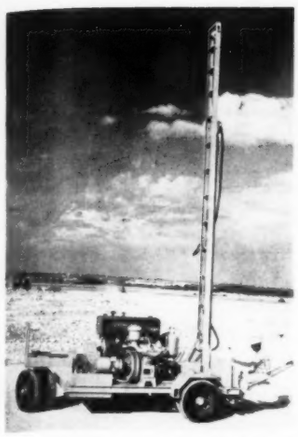
"Contractors Guide, Research and Development in the U. S. Army" explains the kind of work done by each of the seven technical services and lists those who can be contacted for different types of work.

Some of the many research and development interests of the Corps of Engineers are liquid fuels distribution, nuclear power and heating plants, construction and maintenance equipment, bridging, and mapping. Other types of research and development work are handled by the Ordnance Corps, Quartermaster Corps, Transportation Corps, Chemical Corps, and by the Army Medical Service.

Some of the technical services have more than one installation, and each installation has a small business advisor to assist firms taking on a contract.

Unlike construction contracts, most research and development contracts are negotiated, and a contractor's experience, facilities, and quality of workmanship as well as price are important considerations.

Copies of the booklet may be obtained by writing directly to the Chief of Research and Development, Department of the Army, Washington 25, D. C.



The operator of the Damco Blastholer sits and rides through all drilling and moving operations.

Rotary drill designed for constant operation

■ A self-propelled, rotary drill unit designed specifically for construction projects where continuous blasting or drilling is necessary has been announced by Drilling Accessory & Mfg. Co., Inc. The Damco Blastholer requires only one man for operation.

According to the manufacturer, 11-foot holes have been cut in 20 seconds and the rig moved to the next location, ready for drilling, in 90 seconds. The operator sits and rides through all drilling and moving operations. Power is supplied by an International U169 engine.

A mechanical transmission driven by a hydraulic motor delivers bit pressure for rapid drilling. The down pressure and hoisting speed are controlled for constant pressure. Drilling may be carried on at four speeds from 25 to 325 rpm. The rig is propelled through a transmission with four forward speeds and one reverse.

For further information write to Drilling Accessory & Mfg. Co., Inc., 2006 S. Industrial Blvd., Dallas, Tex., or use the Request Card at page 18. Circle No. 259.

Arco publishes handbook

The Arco Publishing Co., of New York, N. Y., has published a new reference book, written by Ephraim Viertels and entitled "Simplified Problems in Strength of Materials and Structural Design." The purpose of the text is to provide an easy, practical, and comprehensive review of the mechanics of engineering for both professional and student architects and engineers. Composed of three parts, the book has 22 subject headings. Questions and answers are provided for each problem.

Among the subjects covered by the handbook are: simple stresses; reactions of beams, girders, roof trusses, and arches; influence lines; theory of bending; moment of inertia; welding and welded connections; and design of plate girders, columns, bearing plates, and roof trusses.

Priced at $5, "Simplified Problems in Strength of Materials and Structural Design" is available from Arco Publishing Co., 480 Lexington Ave., New York 17, N. Y.

Power beam floodlight has 121,500 candlepower

■ A new power-beam floodlight that produces 121,500 candlepower with only a 500-watt rating is announced by the Stonco Electric Products Co. The new unit weighs 13 pounds complete with a 2,000-hour power spot or flood, 25 feet of detachable three-conductor cord with plug and adapter, and a protective lens with guard.

The unit is available with a tripod for portable use or with a heavy mounting plate for truck mounting. Both types are adjustable 360 degrees and are equipped with cast-aluminum positioning knobs to lock focus in any direction. The standard model, recommended for contractor emergency or night crews, is finished in natural aluminum.

The Stonco power-beam floodlight, rated at 500 watts, produces 121,500 candlepower.

For further information write to the Stonco Electric Products Co., 333 Monroe Ave., Kenilworth, N. J., or use the Request Card at page 18. Circle No. 267.

Blaw-Knox appoints F. R. Putnam

F. R. Putnam has been named assistant to the general manager of the equipment division of Blaw-Knox Co., Pittsburgh, Pa. Putnam, a graduate of the U. S. Naval Academy, was recently retired as a rear admiral after twenty-two years of active naval service. Before joining Blaw-Knox, he was head of the Management Control Branch of the Navy's Bureau of Ordnance.

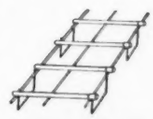
Time and Temper Saver for St. Louis Drivers

STRENGTHENED and STABILIZED with . . .

LACLEDE HIGHWAY STEELS

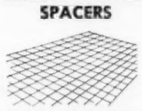
ST. LOUIS' new Third Street Interregional Highway represents the first phase of a multi-million-dollar expressway program designed to speed traffic flow and relieve traffic congestion in the St. Louis area.

Like so many other highways in the Heart of America, this easy-riding high-speed artery is made stronger, safer and more durable with Laclede reinforcing steels.



WELDED DOWEL SPACERS

MULTI-RIB ROUND REINFORCING BARS



WELDED WIRE FABRIC (in sheets)

CENTER JOINTS

RECESS JOINTS

SPIRALS

MISSOURI STATE HIGHWAY DEPARTMENT
GENERAL CONTRACTOR:
Fruin-Colnon Contracting Company

LACLEDE

LACLEDE STEEL COMPANY

SAINT LOUIS, MISSOURI ◆ Producers of Steel for Industry and Construction

For more facts, use Reader-Reply Card opposite page 18 and circle No. 265

A Conway mucker moves into position at one of the headings. These rigs are being used at all six headings for the 32,840-foot-long S-shaped tunnel.

Similar methods use to dri fo

Poor access to job, bad rock formations, alignment changes complicate tunnel job for hydroelectric power project

Six tunnel headings are being worked simultaneously to get the 32,840-foot-long tunnel for the 104,000-kw hydroelectric power project of Pacific Gas & Electric Co., San Francisco, completed on time on California's Feather River near Oroville.

Though Western Pacific railroad tracks parallel the site of the new project, complicating the already difficult access to the tunnel, the joint-venture firms of Utah Construction Co., Salt Lake City, Utah, and Bates & Rogers Construction Corp., Chicago, Ill., sank two adits to start four headings for the tunnel. One of the adits is 900 feet long, the other, 450 feet long. Of the remaining two headings, one is located downstream near the powerhouse at the discharge end of the tunnel; the other is at the intake works.

This project, involving construction of river diversion works, seven miles of tunnel and penstocks, and a powerhouse—will have the reservoir level at elevation 1480 and the turbine blades at elevation 890. This gives the S-shaped horseshoe tunnel a power head of 590 feet. The average grade of the tunnel, from its heading at the diversion works to where it drops to the powerhouse is .4 of 1 per cent. Designers chose a combination of two vertical curves reversed, with a straight vertical section 80 feet deep in the center, making the tunnel resemble the letter S as it drops through solid rock to a point close to the powerhouse level. In the power drop section, where pressures will be great, the 24-foot-diameter tunnel will have a steel lining. Elsewhere, it will have a concrete lining that will reduce its diameter to 19 feet.

The serpentine, granite and limestone formations in which the tunnel is being cut—formations so blocky that about 80 per cent of the tunnel requires steel and timber supports—start at the intake works heading. Here, the tunnel is being supported at 4, 5, and 6-foot centers with 18-pound rib steel having heavy 6×6 Douglas-fir spreaders and a 3-inch fir lagging behind the steel. All steel rib supports for the tunnel are being bent to shape in the Geneva Steel Works plant of Commercial Shearing and Stamping Co. in Utah, shipped to Oroville by rail, then trucked to the site.

At this heading, the smallest drill-

Over ¼ mile of pipe in one truckload!

Here goes more than 1400 ft of drainage pipe, made of Beth-Cu-Loy corrugated galvanized culvert sheets. What other type of pipe is light enough to permit such economical loading and transportation?

Light weight also makes Beth-Cu-Loy easy to handle when loading, unloading, or installing at the site. In smaller diameters it can usually be handled manually and even larger sizes rarely require expensive, heavy lifting equipment.

Yet light as it is, pipe made of Beth-Cu-Loy is strong because it's steel. Flexible, too, so that it flexes with the fill to help distribute the load peripherally. It conforms well to grade and alignment, and absorbs vibration, impact and the shifting effect of weather changes. Its copper content plus tight zinc coating make Beth-Cu-Loy corrosion-resistant.

Trenching for Beth-Cu-Loy pipe is less costly, for the trench need be only wide enough to admit the pipe. There is less earth to remove, less to replace. No breakage to allow for, either, with corrugated galvanized steel!

Beth-Cu-Loy galvanized sheets conform to the rigid specs of the American Association of State Highway Officials. If you would like further details about Beth-Cu-Loy for drainage purposes, just get in touch with any Bethlehem sales office, or with one of the fabricators using our culvert sheet steel stock, whose names we will gladly supply.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

For more facts, use Reader-Reply Card opposite page 18 and circle No. 266

to drive six headings for hydro tunnel

A 38-inch conveyor belt carries material from the Conway 101 mucker. About 18,000 cubic yards of rock are carried by the belt before it has to be replaced.

ing equipment on the project is being used to prepare for the short 4-foot rounds. The drill jumbo, holding 12 Gardner-Denver 73 machines using Timken tungsten-carbide insert bits, drill a pattern of 92 to 95 holes in the hardest rock. This number ranges downward to about 80 in the softer ground. Where the rock is solid, shooting is heavier; shooting is lighter in places where the formation is blocky.

Tunnel excavation, as in all the other headings, runs about 18 cubic yards per linear foot. About 230 pounds of Giant 45 per cent powder is used to get this yardage. Delays from one through ten pull the rock from the center-hole pattern so that the rock works out toward the sides of the tunnel.

Following safety rules laid down by the company, the powderman has the lead wire—coiled and with the ends in his possession—when the hookup is made to the shot. Only then is the wire unrolled to the connecting points. The complete hookup is not made until everyone is in the clear.

Blasted rock is being removed from this heading by a Conway 101 mucking machine with a 38-inch conveyor belt that carries about 18,000 cubic yards of rock before it has to be replaced. Muck trains are made up with the help of a hoist, mounted on the jumbo, which lifts empties over loaded cars and sets them in position to be loaded.

The four Goodman electric locomotives that serve this heading are assisted up a steep ramp from the tunnel inlet by an electric powered hoist with a two-way hoisting cable system. Disposal was first handled by carrying muck across the river from the heading on a Bailey bridge, then dumping it as rip rap against the side of the Western Pacific railroad. Since December, 1955, when one of the highest floods on record occurred on the Feather River and washed out the bridge, another method of disposal has been used. Muck cars dump from a discharge point, and the muck is picked up by a Bucyrus-Erie 22-B shovel and loaded into trucks that haul to a waste area.

Two headings at Adit No. 1

Both headings at Adit 1 are pulling average rounds of 8 feet, which take about 2½ hours to complete, provid-

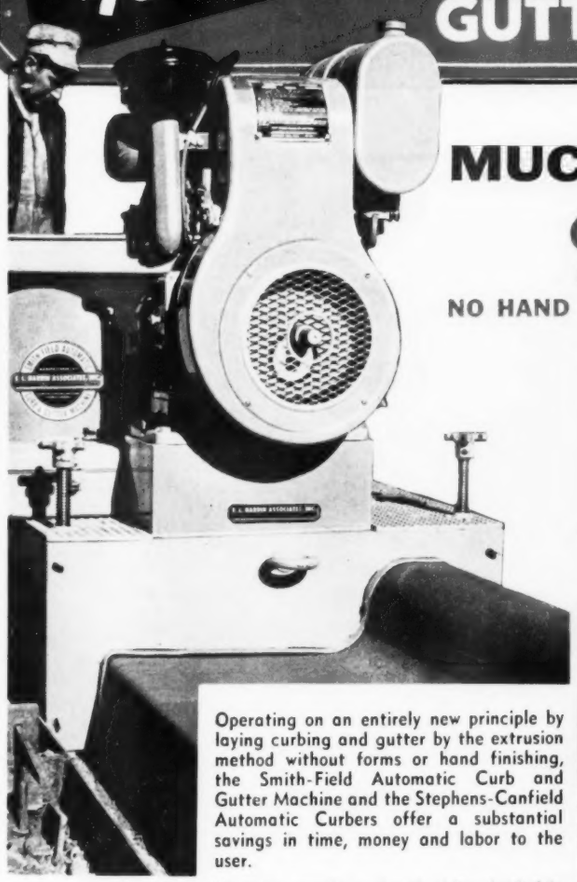
(*Continued on next page*)

Faster

BETTER CURB AND GUTTER LAYING at MUCH LESS COST

Save TIME, MONEY AND LABOR WITH THIS NEW METHOD

NO HAND FINISHING —— NO FORMS



SMITH-FIELD AUTOMATIC CURB AND GUTTER MACHINE MODEL MARK 3

STEPHENS-CANFIELD AUTOMATIC OFFSET CURBER MODEL 56-W

Operating on an entirely new principle by laying curbing and gutter by the extrusion method without forms or hand finishing, the Smith-Field Automatic Curb and Gutter Machine and the Stephens-Canfield Automatic Curbers offer a substantial savings in time, money and labor to the user.

Working equally well with either Asphaltic or Portland Cement concrete, the Smith-Field Automatic Curb and Gutter machine will lay up to 1,000 ft. of integral curb and gutter per day, under efficient methods and the Stephens-Canfield Automatic Curbers, up to 2,500 ft. per day.

Write for full details and prices

STEPHENS-CANFIELD AUTOMATIC CURBER MODEL 55A

E. L. HARDIN ASSOCIATES, INC.

SALISBURY, NORTH CAROLINA U. S. A.

SOLE MANUFACTURERS AND DISTRIBUTORS—U.S.A. AND FOREIGN
PATENT NO. 2,707,422—AND OTHER PATENTS PENDING

For more facts, use Reader-Reply Card opposite page 18 and circle No. 267

Work is done on one of the two spare Gardner-Denver 93 drills in the drill-repair shop located at Adit No. 1.

per cubic yard. Only when ground is exceptionally tough to shoot does the amount reach 3.25 pounds. Muck disposal at this adit is also easy; since a railroad and river does not have to be crossed, a conventional system of dumping is being used.

The big difference in work at this adit stems from the fact that the downstream heading consists of the penstock section, and this requires everything from horizontal to vertical drilling.

Ingersoll-Rand Jackhamers and spaders are being used for the most part to put down holes for 4-foot rounds. Shooting is as light as possible, and excavation is being done very carefully by an Eimco shaft mucker. This machine loads rock to an overhead monorail, which can be hoisted to the top. The first vertical curve in the S-shaped tunnel, the vertical 80-foot-drop section, and most of the lower vertical curve are being mined by this method. At first, officials planned to mine the lower vertical curve from the bottom and drive part of the upper section as a raise, but a bad cave-in made that impossible.

Surge chamber heading

The sixth heading involves excavation from the top for a large surge

(*Continued from preceding page*)

ing some contrast to the 1½-hours needed for the 4-foot rounds at Heading No. 1.

The two headings at this adit are adequately staffed with their own equipment, including a gantry-type jumbo carrying ten Gardner Denver 3½-inch Model 93 drills. Gardner-Denver jibs are used to mount the drills on one of the jumbos; Ingersoll Rand jibs are used on the other machine.

To date, the upstream heading at Adit 1 has been drilled unsupported —"bald-headed" to tunnelmen—since the formation is of fairly solid granite. Support has been needed for the downstream heading.

Drilling, loading, blasting, and removal of the broken rock is handled at both headings in much the same manner as at Heading No. 1, but the disposal problem has been solved in a slightly different way.

The 20-yard mine cars, made by Moran Engineering Co., South Gate, Calif., are being hauled out by Goodman and Westinghouse locomotives. At the adit entrance, the cars move onto a high timber trestle to clear the Western Pacific railroad tracks that emerge from a nearby tunnel. A car unloader dumps the cars from the trestle, and the muck is shoved away by a Cat D6 with dozer.

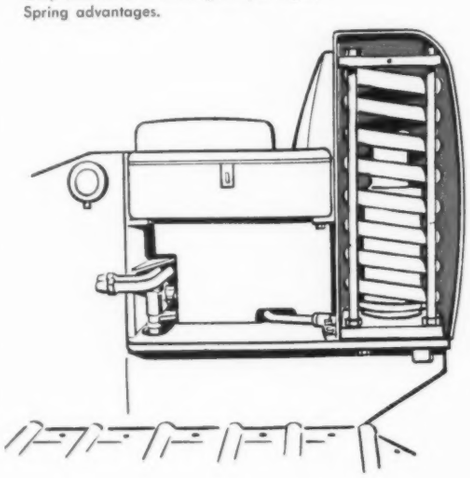
At this location, a stiffleg derrick with an electric powered 3-drum hoist is available for handling ribs and other material, a carpenter shop has been set up to cut timber lagging to length, a blacksmith and machine shop are used for repairs, and a separate drill-repair shop is used to keep several drills in new condition and on reserve at all times.

Two headings at Adit 2

Only slight differences mark the working of this adit and Adit No. 1. The rock formation here is hard but blocky, and steel supports in 4, 5, and 6-foot sets are used at both headings. Three-inch Gardner-Denver drills on a solid mounting are being used to drill a hole pattern that is basically the same as at the other three headings, and Conway 101 mucking machines and Moran side-dump cars remove the broken material.

As at the other headings, the powder ratio is about three pounds

Exclusive Hydro-Spring reduces the effects of shock forces by an actual 67%, or more. Only International Drott gives you Hydro-Spring advantages.



How patented Hydro-Spring increases equipment life and capacity

Exclusive International Drott Hydro-Spring is a hydraulic cylinder enclosed in a heavy-duty *locomotive-type* coil spring. Shock force displaces oil from main lift cylinders into the Hydro-Spring cylinder—extending it and compressing the big spring to absorb and cushion impact loads.

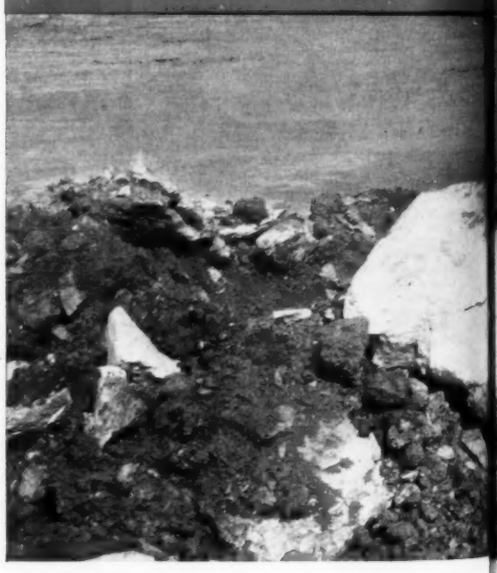
Owners declare that Hydro-Spring adds a whopping 25% to loader and tractor life—besides reducing downtime and boosting production!

Try Hydro-Spring, turned on and off, to prove a vital money-making difference between International Drott and unprotected front-end loaders! Measure the job-getting, yard-adding advantages of exclusive triple-power, pry-action break-out and other International Drott exclusives. And see how you can beat a fleet of limited-duty rigs with an *exclusive* Four-In-One. See your International Drott Construction Equipment Distributor for a demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

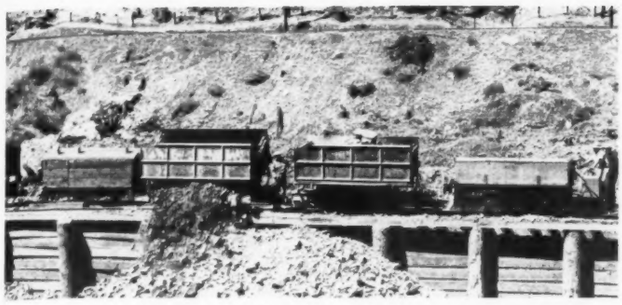
INTERNATIONAL®
DROTT®

HOW CAPACITY ADDI
. . . shock-swa
stops hose-bursting, frame



When you're semi-skidding heavy bucket-loads of material over rough terrain, and the skid-shoes contact a high spot abruptly, linkage isn't pounded—and your spine isn't mauled! *Shock-swallowing Hydro-Spring takes over. No pain—no strain!*

When plow into tou load hose co Hydro-Spring

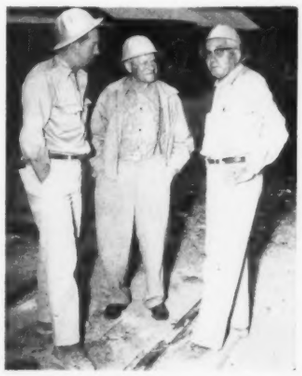


Broken rock taken from the intake heading is side-dumped from muck cars. An electric-powered hoist with a two-way hoisting cable system helps the trains up a steep ramp.

chamber. Jackhammer and spade drilling is being used, and material pulled by the 4-foot rounds is being loaded out by an Eimco mucker. The concrete lining is being placed as the surge chamber goes down, a small crane placing the concrete in the steel forms. Concrete for this work is being obtained from the powerhouse contractor nearby.

Aside from the drills, muckers, and rib supports, there are a number of other pieces of equipment on which the joint-venture firms standardized as much as possible. All air delivery lines consisted of Naylor 8 and 10-inch pipe, and all fan and suction lines were of Naylor 30-inch pipe. All suction fans are Joy Axi-Vanes. Electric-powered Sullivan air compressors of the permanent type, in 850 and 1,850-cfm capacity, were installed in stationary houses at various access points along the tunnel. Three Joy 630-cfm portable compressors provided some flexibility in air capacity at each of the headings.

The tunneling phase of this job is expected to be completed by next month, despite some serious setbacks caused by a flood on the Feather River in December, 1955, and high water in February and in March, 1956. This did extensive damage to the work, particularly at the intake heading. The Bailey bridge that had been used by muck disposal equipment was washed away and the heading was flooded to a point above the framing of the tunnel portal, but fortunately mud was deposited only



In the staging area outside Adit No. 1, some of the project officials talk over details of the work. Left to right are Ross Eddington, superintendent at the heading, Ben Arp of Utah Construction Co., and Paul Guinn, general superintendent.

to a point slightly above the railroad tracks. A considerable amount of cleanup was necessary, but the heading was operative several weeks after the flood had gone down.

The placement of the concrete lining of the tunnel is scheduled to start in December, and the installation should be complete some time in 1958.

Personnel

Field operations for the Pacific Gas & Electric Co. are under the general supervision of H. W. Haberkorn, of the company's hydroelectric construction division in San Francisco. E. G. Hall, Jr., resident engineer of the Hydro division, is assisted by J. J. Mattimoe, field engineer.

Field operations for Utah Construction Co. and Bates & Rogers are under project manager Cecil Welton. His principal assistant is Paul Guinn, general superintendent, and Ben Arp is available on a consulting basis.

THE END

Shipments of structural steel totaled 2,907,703 tons for the first eleven months of 1956, an increase of 6 per cent over the corresponding period in 1955. November shipments of structural steel, amounting to 276,045 tons, were 7 per cent greater than for November, 1955.

DDING,

-swallowing Hydro-Spring

frame-mauling, spine-smacking impact!

When you solidly set the Skid-Shovel or Four-In-One in tough material to apply famous bucket-heaping, pry-action break-out, you don't punish the equipment, or yourself. *Shock-swallowing Hydro-Spring takes over—intercepts "slam-bang" bumps!*

When you're using the Four-In-One in dozer position and plow into tough material like this hard-frozen soil, you don't overload hose connections with a tooth-jarring crash. *Shock-swallowing Hydro-Spring "gentles" trouble-causing forces by two-thirds, or more.*

When you dump a bucketful of rock in one sudden clatter, don't brace for a bump, or expect something to break loose. *Shock-swallowing Hydro-Spring cushions impact, thus cuts time loss, and practically eliminates hydraulic hose failures.*

← For more facts, circle No. 265

Six new models added to all-wheel-drive line

■ Its line of all-wheel-drive trucks has been expanded through the addition of four six-wheel-drive models and a pair of four-wheel-drive rigs, the International Harvester Co. has announced. All the new trucks are heavy-duty units.

The new six-wheel-drive 6×6 models are the SF-170, with a gvw rating of 22,000 pounds; the SF-172, rated at 26,000 pounds gvw, the SF-180, rated at 30,000 pounds gvw; and the SF-182, with a gvw rating of 33,000 pounds. The remaining new models are the S-170 (4×4) and the S-180 (4×4), with gvw ratings of 19,000 and 20,000 pounds, respectively.

The 6×6 models are available in 142, 154, 172, and 190-inch wheelbases. The four-wheel-drive rigs are offered with 130, 142, 154, and 172-inch wheelbases. Front-axle capacity is 7,000 pounds. Single-reduction axle ratios range from 7.065 to 1.0 on the SF-180 series to 6.166 to 10 on the S-170 series.

Among the six new all-wheel-drive trucks added to the International Harvester line is the SF-170 (6×6), which has a gross vehicle weight rating of 22,000 pounds. All the new models are heavy-duty rigs.

Standard rear-end loading height and a minimum increase in the front-end height with excellent ground clearance are among the design features of the new models, according to the manufacturer. A newly designed front-drive axle with a special center section, and outrigger-type front spring mountings facilitate lowering of the chassis front end and provide better stability, the manufacturer reports. Frame reinforcements have been extended forward beyond the front spring mounting brackets for additional strength and rigidity in the front end.

For further information write to the International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 21.

Tire chain features snap-on cross chains

■ A rubber-cushioned tire chain that features snap-on, snap-off cross chains is announced by The Thomas Co. Called the Ruggo tire chain, the assembly is designed to fit the tires of any heavy-duty vehicle.

A rubber roller arrangement on the Ruggo tire chain protects the tire, and allows quick and easy removal of the cross chain.

Ruggo tire chains incorporate a new rubber roller arrangement. The roller acts as a cushion for the chain, preventing damage to the tire. The cross chain snaps onto a swivel hook extending through the roller. As the wheels turn, the hook and the cross chain swivel, permitting the cross chain to wear evenly on all sides.

For further information write to The Thomas Co., 1645 Hennepin Ave., Minneapolis 7, Minn., or use the Request Card at page 18. Circle No. 22.

Chain Belt Co. appoints

The Rex Construction Machinery Division of Chain Belt Co., Milwaukee, Wis., has made Charles Flamand eastern district manager, succeeding Harold Lavin. Lavin has been made district manager of a newly organized office serving the New Jersey-New York City area.

W. Y. Daniel is now southeastern district manager.

Four more improvements in the Barber-Greene Finisher

Four new improvements give the Barber-Greene Finisher faster speed, faster travel, lower maintenance cost and increased power.

Improving the Barber-Greene Finisher is not something new. Scores of major improvements have been embodied in its design since it was first released to the field 20 years ago.

These improvements have been incorporated without spectacular announcements or fanfare. They have all been based on vast experience. In fact, the Barber-Greene Finisher is now paving its second million miles, which is many times the mileage and tonnage records of all other asphalt paving machines in the world combined.

These are all proven, sound improvements developed from experiences in laying every type of mix, in virtually all conditions. Machines embodying this group of design changes are now in production and are designated as the Model 879-B.

Latest improvements include:

NEW TRANSMISSION—Provides both higher operating and travel speeds. The new transmission still provides 12 forward speeds giving a wider range of operation.

HIGHER SPEED TAMPER—This new design permits faster laying speeds and reduces maintenance costs.

NEW CRAWLERS—Precision-drilled pads and larger pins will further decrease maintenance costs.

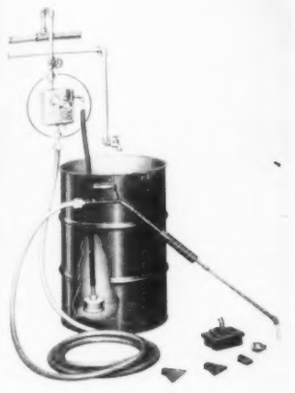
NEW POWER UNIT—20% more power. This means pushing even bigger trucks, handling even steeper grades, greater reserve for high altitude, and higher speeds of operation.

Note To Barber-Greene Finisher Owners
These latest improvements, as well as many previous improvements, can be incorporated in your old machine. Necessary parts are now made up in kit form for each modification separately. A folder describing the various kits is available.

57-3-F

Barber-Greene BG
AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT
For more facts, use Reader-Reply Card opposite page 18 and circle No. 269



New steam-cleaning unit operated by steam power

■ A new steam-cleaning unit that requires no motor, pump, or electrical connections—the steam line, with pressure of 40 pounds or more, supplies the only power—is announced by the Clayton Mfg. Co. Model S-809 is said to be 44 per cent lighter than previous models.

The 8½×7-inch control panel can be readily connected to any ¾-inch-valve steam outlet. Cleaning operations can begin as soon as the connection is made, without delay for a warm-up period.

Cleaning solution is picked up in a metered amount by a strainer-protected suction head immersed in a drum or other receptacle. The solution is mixed with live steam and delivered in a spray through a gun nozzle. The control panel's single lever varies capacity from 120 to 190 gph. The same valve controls the temperatures of the solution and the velocity at the nozzle.

For further information write to the Clayton Mfg. Co., P. O. Box 550, El Monte, Calif., or use the Request Card at page 18. Circle No. 228.

Flexible pavement study

A new bulletin dealing with different methods used in designing flexible-type or bituminous-surfaced pavements by nineteen state highway departments and other agencies is now available from the Highway Research Board, 2101 Constitution Ave., Washington, D. C.

Bulletin 133 compares the designs that would be used by all 19 agencies, provided all used the same materials for pavements in different geographic regions.

Bulletin No. 132, also put out by HRB, contains papers from the 35th annual meeting. Glenway Maxon discusses "Quality Concrete for Highway Construction with Central Mixing Plant"; Robert H. Tittle, "Self-Propelled Machines for Unformed Concrete Slab Construction in Illinois"; and William E. Grieb and Robert A. Marr, Jr., "Use of the Kelly Ball for Field Measurement of Concrete Consistency". The fourth paper, "Sawed Joints in Concrete Pavements; Progress and Problems" is by E. J. Coppage, Jr.

The booklets, both priced at 75 cents, may be obtained from the Highway Research Board.

For more facts, circle No. 270 →

WITH A SLIGHT MODIFICATION, the Davis Model 102 loader and Model 185 backhoe will fit the John Deere 420 C crawler tractor. Primarily, the modification involves the use of a heavier-than-standard subframe. For more details write to **Mid-Western Industries, Inc.**, 1009 S. West St., Wichita, Kans., or use the Request Card at page 18. Circle No. 55.

HERE'S THE *NEW* EUCLID

TS-24 TWIN-POWER SCRAPER

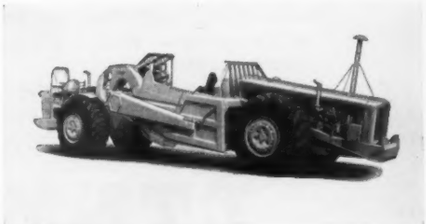
31 YARDS HEAPED—24 YARDS STRUCK • 518 H.P.—ALL WHEEL DRIVE
TORQMATIC DRIVES—NO CLUTCH—FULL POWER SHIFTS

Here's a one-man earthmoving spread that moves more yardage at lower cost than any other scraper. It incorporates all of Euclid's scraper design features—hydraulic lever action, a low, wide, easy loading bowl, the 4-section cutting blade that's reversible and adjustable, and unequalled accessibility for servicing.

With a total of 518 h.p. and two Torqmatic Drives the Twin-Power TS-24 self loads in any scraper material—can work independent of other equipment. It's big but highly maneuverable and easy to operate, with power and traction to work under conditions that stop other scrapers.

Ask your dealer for proof that this new Euclid TS-24 Scraper can set new production records at lower cost on your jobs—and have him show you why *Euclids are your best investment.*

A new Euclid that sets higher standards of performance in all soils—wet or dry—hard clay or loose sand!



EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Earthmovers make good time grading rocky soil for highway

In some of the heaviest going, two Cat D8's have a tough time pushing and pulling a one-toothed Cat 28 ripper through the heavy material. Maximum tooth life is about six hours.

Ripping their way through the hills of southwestern Missouri, five Caterpillar scraper spreads hacked out the grade for U. S. 66—the new connection from Joplin, Mo., to the Oklahoma NE Turnpike. (See pg. 94)

Although only 140,000 of the almost two million cubic yards of earth work were classified as rock excavation, a large part of this work was in rocky hardpan and cherty flint that were just short of being solid rock. All the material that could be ripped was moved by scrapers, and only the solid ledge rock was excavated by other methods.

This new route, essentially a part of the turnpike system, is a free road built by the Missouri State Highway Department to link existing highways and the new pike. It is a four-lane divided highway, with access restricted to interchanges. Aside from the lack of toll-collection facilities, the finished section resembles a major toll road.

After the general contract for excavation, base, and paving had been awarded to Koss Construction Co., Des Moines, Iowa, on a low bid of $2,839,861.83, grading and granular base work were sublet to W. J. Menefee Construction Co., Sedalia, Mo., and structures to List & Weatherly Construction Co., Kansas City, Mo. A separate contract for two bridges over Shoal Creek was awarded to Universal Bridge Co., Kansas City, Kans.

The new road has two 24-foot roadways paved with 10-inch concrete slabs and separated by a 40-foot depressed median. Each of the roadways has a 10-foot stabilized outside shoulder and an 8-foot inside shoulder. A 4-inch crushed-stone base course under the pavement extends 1 foot outside the edge of the pavement. The complete project includes 8.696 miles of the double roadway section on Highway 266 and 0.379 miles of single roadway, which provides a connection to Highway 166.

Scrapers handle rocky soil

Existing secondary roads in this hilly wooded area wind along the tops of the ridges in a typical Ozark fashion, but this new expressway has been slashed through the country on almost a straight line. Practically every foot of the right-of-way had to be cleared of a dense growth of

...one big reason for accuracy and dependability of Etnyre "Black-Topper"

Because the pumping requirements of a bituminous distributor are of a special nature, Etnyre found it necessary to design and build its own pump specifically to meet those needs.

As the "heart" of the extremely compact circulating system, the Etnyre Pump forces material under constant pressure to the spray bar with an even, nonpulsating flow. Flow of material is metered with absolute accuracy from .05 to 3 gallons per square yard. It never pumps more material than can be sprayed.

With suction on top and discharge at bottom, pump is self-draining. There is no low point to trap material . . . *material flows straight through!* As you can see from the cutaway, there are least possible metal-to-metal surfaces. That's why the Etnyre Pump is easier to turn with less power, especially in cold weather, or when pumping heavy materials. Dozens of other features have established the Etnyre design as the most practical pump known. Get complete details on this and other Etnyre advantages from your nearby dealer, or write E. D. Etnyre & Co., Oregon, Illinois, U.S.A.

SEE YOUR ETNYRE DEALER

ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 271

Thin cuts are carefully shaved from the roadway as it nears finished grade. The heavy rigs operating over the fills also helped achieve the necessary compaction in the roadway.

Contractor uses rippers and modified scrapers for tough work; rock for base and concrete aggregate quarried in right-of-way

hardwood timber before the earthwork could be started.

Menefee began clearing the 415 acres of timber late in March of last year with four Caterpillar D8 tractor-dozers and a D9. These pushed over the trees and brush and grubbed the stumps as the trees were pushed down. The merchantable timber and some of the larger trees were sawed by a crew working with four Disston chain saws. A Caterpillar D7 tractor with a root rake piled the brush and trees on the right-of-way for burning.

There was very little topsoil to strip, since the rocky subsoil outcropped in many areas. But, in spite of the rough and rocky material, Menefee chose to move everything but the ledge rock with scrapers. Five spreads of Caterpillar scraper equipment started in right behind the clearing crews on April 18 and had the grading and base ready for the paving crew by August.

One of the spreads consisted of six DW21 scrapers push-loaded by two D9 tractors. Three DW10 scrapers were split into two spreads, each of which used at least one D8 for pushing. The other two spreads had D8 crawler tractors. One of these used three Cat 80 scrapers, while the other had five LeTourneau-Westinghouse FP and LP scrapers. In addition to these haul units and pushers, there were a number of auxiliary units that worked with several of the haul spreads.

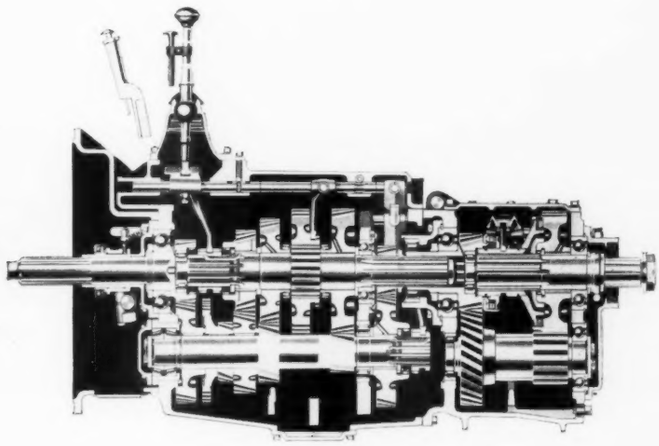
Ripping the rocky soil—one of the major jobs—seemed more like rock excavation than earthwork. It was handled by four D8 tractors pulling Cat 28 and 30 rippers. Another D8 was equipped with an Esco Model 42 Buck Forte Dozer-Rooter attached to the dozer blade. Many times, when one dozer was unable to move a ripper through the rock, one of the six D8 tractor-dozers gave an assist.

In addition to the six D8 dozers, there were four D7 tractors with dozers on the project. Seven No. 12 motor graders maintained haul roads and finished the sections. A fleet of six Case rubber-tire tractors pulling Grace double-drum sheepsfoot rollers provided the compaction.

Most of the material had to be ripped before the scrapers could even begin to load, but in many areas,

(*Continued on page 84*)

Specify: FULLER R-1150



ROADRANGER® TRANSMISSIONS

for earthmoving and construction equipment

The Fuller 9-speed semi-automatic R-1150 ROADRANGER Transmission is designed specifically for tractors and trucks equipped with engines of up to 1150 cu. in. piston displacement, and developing up to 800 foot pounds of torque.

- No gear splitting—9 selective gear ratios are evenly and progressively spaced
- Easier, quicker shifts—38% steps between ratios
- One shift lever controls all 9 forward and 1 reverse speeds
- Engines work in peak hp range with greater fuel economy
- Less driver fatigue—1/3 less shifting
- Range shifts pre-selected—automatic and synchronized

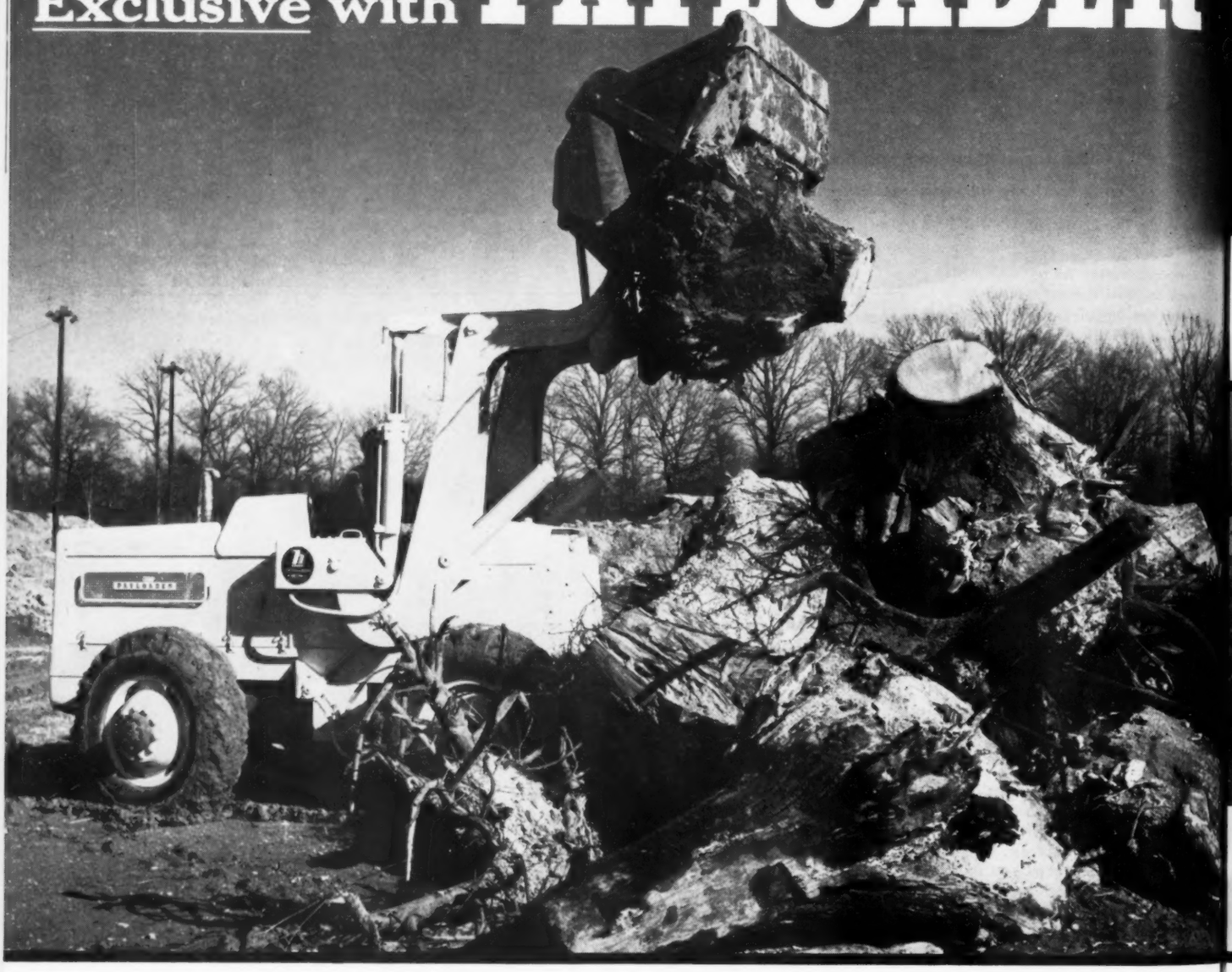
Fuller TRANSMISSIONS®

where horsepower really goes to work

FULLER MANUFACTURING COMPANY
Transmission Division, Kalamazoo, Michigan

For more facts, use Reader-Reply Card opposite page 18 and circle No. 272

Exclusive with **PAYLOADER®**



DROTT 4-in-1 buckets

The Frank G. Hough Co. is pleased to announce that another valuable attachment has been added to those available exclusively for "PAYLOADER" tractor-shovels. This is the Drott 4-in-1 bucket which, coupled with the power and mobility of the current line of 4-wheel-drive "PAYLOADER" tractor-shovels, gives them greater performance on many jobs, and the ability to handle many operations that usually require special machines.

More than ever before, you get more tractor-shovel when you buy a "PAYLOADER", because you get more tractor-shovel performance and more versatility. They have power-transfer differentials — an exclusive "PAYLOADER" feature that maintains effective traction on mud, gravel, ice and snow. They have no-stop power-shift transmissions and torque converters . . . planetary final drives . . . power steering and 4 wheel power brakes. They have the exclusive bucket motion with 40° tip-back and powerful pry-out action that enables them to dig more, carry more and deliver more . . . to outperform any comparable tractor-shovels.

Your "PAYLOADER" Distributor is anxious to demonstrate what these "PAYLOADER" tractor-shovels and Drott 4-in-one buckets can do for you.

It's a Shovel The four-in-one bucket can always be used as a regular tractor-shovel bucket to dig, carry and dump in the regular manner.

It's a Clamshell Use the powerful clamshell action to clean up small piles, to pick up without tractor travel, to grasp and handle stumps, pipe and timbers fast.

It's a Scraper With slight clam lip opening you have a carry-all scraper that heap-loads itself, carries and spreads thin layers or dumps completely. Strips sod and grades with real accuracy.

It's a Bulldozer Open the clam lip full, and you have a sturdy bulldozer with hydraulic finger-tip blade-pitch control to regulate dozing depth and to discharge sticky material.

help you handle more jobs

OTHER USEFUL ATTACHMENTS

Hydraulic Back-hoes	Land-clearing Rakes
Crane Hooks	Scarifier Teeth
Fork Lifts	Special Buckets
Pusher Plates	Pick-up Street Sweepers
Winches	Rotary Snow Plows
Log and Lumber Grapples	"V" and Blade Plows

The knowledge and experience gained in 35 years, building thousands of tractor-shovels — more than all others combined — is your assurance of superior design, engineering and value when you invest in a "PAYLOADER" tractor-shovel.

SAY "HUFF"

PAYLOADER®

MANUFACTURED BY

THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 273

THE FRANK G. HOUGH CO.
762 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" models with Drott 4-in-1 Buckets as checked:

☐ model HO 2¼ yd. ☐ model HH 1½ yd.

☐ model HU 1 yd.

Name

Title

Company

Street

City

State

31

The loading of the DW10 scrapers was no easy job. The Cat D8 push tractor picks up the wheels of the rig as it attempts to get the scraper's cutting edge to bite into the ground.

The operator of this Caterpillar D8 gets ready to start ripping into the tough mixture of rock and earth with an Esco Buck Forte rooter attached to the dozer blade.

(*Continued from page 81*)

tractors had all they could do to rip with a single tooth in the ripper and with tractors both pushing and pulling. Ripper teeth sometimes lasted only an hour. Their maximum life was around six hours.

Modify scrapers

As a section was scarified, scrapers moved in and excavated the layer of loose material, then the rippers came back for another pass. The big D9 tractor and the DW21 scrapers loaded the rough material smoothly. The torque converter of the big tractor permitted it to slow right down when the going was tough, but the tractor kept the scrapers moving along so that they obtained a heaping load without any rough treatment. Once the scraper was loaded, the D9 gave it a fast start so that the operator could leave the excavation in the highest possible gear.

The DW10 scrapers that handled a large part of the material were converted by the John Fabick Tractor Co., Inc., St. Louis, Mo., to Menefee's specifications. The bowls of the scrapers were cut apart in the middle and lengthened 20 inches. Side boards were added to increase the struck capacity to 14.27 cubic yards.

Though the DW10 tractors had little trouble on the haul and unloading cycles, the light scrapers sometimes gave a little trouble at the start of the loading run. It was not unusual to see the D8 push tractor pick the rear wheels of the scraper right off the ground at the start of the loading cycle in an attempt to get the cutting edge started down into the rock. But once the bowl was about half full, the weight made the wheels settle back to earth.

Working all five spreads a single 10-hour shift six days a week, this entire setup moved close to 100,000 cubic yards of material per week. Hauls averaged 1,800 to 2,000 feet, and the job called for cuts as deep as 38 feet and fills more than 40 feet high. All of the fill material was placed in maximum lifts of 6 inches and was thoroughly compacted by the heavy scrapers operating over it and by sheepsfoot rollers.

Quarry on right-of-way

The solid ledge of rock that could

THE A-W 3-WHEEL ROLLER

8-11, 10-12, 12-14 ton models. The left drive roll is keyed to the axle shaft; the right turns on heavy duty bushings independent of the left roll and axle. Torque-proportioning-type differential transfers power automatically from a slipping roll to the opposite one, giving traction under almost any conditions.

THE A-W TANDEM ROLLER

5-8, 8-12, 10-14 ton models. Full-width seat and dual controls are standard on all models. Forward and reverse levers are located at each side of the platform, steering lever at center, thus permitting the operator to sit where visibility is best.

Austin-Western also builds a 3½-6 ton Portable Tandem Roller

AUSTIN-WESTERN ROAD ROLLERS

...Engineered for precision operation from power unit to final drive

This new series by America's pioneer manufacturer of motor rollers features smooth, flowing power, carefully balanced weight, and finger-tip hydraulic steering. These advantages mean increased maneuverability and faster, more efficient compaction.

All A-W rollers are powered by your choice of gasoline or diesel engines with 4-speed (regular) or 2-speed (optional) transmissions. Torque converter drives are available. The drum-type front and rear rolls permit sand and water ballast variations in weight up to 4 tons. Here are some typical design and construction features:

- **Oversize axles and antifriction bearings for longer life.**
- **All transmission gears are machine cut and heat treated**
- **Entire transmission is equipped with antifriction bearings**
- **3-wheel rollers have heat-treated alloy steel bull pinions and high strength steel bull gears**
- **Tandem rollers have machine-cut, heat treated final drive bevel gears and pinions**
- **Outside edges of finished rolls are beveled to prevent marks in hot materials**

More than 75% of all parts of the 3-wheel and tandem rollers are interchangeable—an important advantage for the man who owns both kinds. See your nearby Austin-Western distributor. Or write us for complete information.

Power Graders • Motor Sweepers • Road Rollers • Hydraulic Cranes

BALDWIN BLH LIMA-HAMILTON

AUSTIN-WESTERN WORKS
BALDWIN-LIMA-HAMILTON
Construction Equipment Division
OTHER DIVISIONS: Eddystone • Lima • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Standard Steel Works • Madsen • Pelton
AURORA, ILLINOIS, U.S.A.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 274

At work on another spread are a Cat D9 push tractor and Cat DW21 scraper. The torque converter of the D9 allows it to slow down so that heaping loads can be picked up smoothly by the scraper.

Finishing work is almost as tough as cut-and-fill work in the mixture of hardpan and earth or cherty flint rock and earth. This No. 12 motor grader brings some heavy material down as it finishes this backslope.

not be ripped was quarried and crushed for use as crushed-stone base course and concrete aggregate. Wagon drills and dynamite were used to loosen the rock, which was then picked up by a Lorain 2½-yard shovel and dumped into three Euclid 15-ton end-dumps that hauled to the crusher.

At the Pioneer portable unit, which consisted of a 24 × 36 jaw crusher and a triple-roll secondary crusher with screening unit, the material was given some special processing to remove the chert—material unsatisfactory for concrete aggregate.

The stone for the 4-inch base course was hauled by truck to the roadway and distributed on the grade by a Blaw-Knox spreader. Six International and Chevrolet water trucks with 1,500-gallon tanks applied water to the material, which was shaped to finish grade by the motor graders. Most of the base compaction was handled by a Tampo 13-wheel self-propelled roller, and finish rolling was done by a Huber 10-ton three-wheel roller.

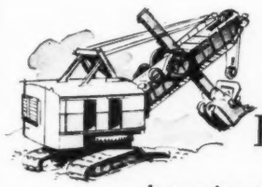
Field service

To service this big spread of equipment, Menefee set up a complete field maintenance and overhaul shop on the job. Three well stocked parts trailers carried all the parts that were needed to repair minor breakdowns and eliminate loss of time. The well equipped shop was even capable of handling major overhauls. Four mechanics and three welders staffed the shop and kept the equipment at maximum efficiency at all times.

Lubrication was handled by a crew of five men with two specially equipped Chevrolet lube trucks. Each of these carried Alemite grease pumps and reels, Kohler light plants, and air compressors that operated from the power takeoff of the truck. All the needed grades of grease and oil were carried on the load, together with a barrel of water.

Four of the men used the two trucks to make the rounds of all equipment after working hours each evening, giving every machine a complete servicing. During working hours, one of the men used one of the trucks to provide emergency service for the entire job.

(*Concluded on next page*)



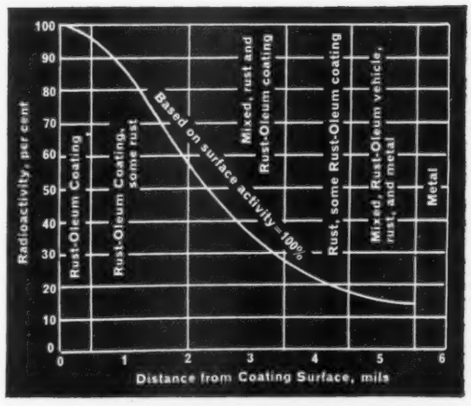
Here's how **RUST-OLEUM**®
penetrates rust to bare metal
on your rusted surfaces
as seen through the "eyes"
of radioactivity

Illustration of cross section of rusted metal coated with Rust-Oleum (enlarged 150 times)

Geiger Counter Traces Rust-Oleum Penetration Through Rust to Bare Metal

When you apply Rust-Oleum 769 Damp-Proof Red Primer directly over rust, the specially-processed Rust-Oleum fish oil vehicle works around the rust particles, through the fissures in the rust formation, and into the pits in bare metal—driving out air and moisture. *Irrefutable proof* of this penetration is now yours . . . the results of nearly three years' research utilizing radioactive tracing with C^{14} radioisotope.

The methods and results of this research are presented in a complete thirty-page report, entitled "The Development of a Method to Determine the Degree of Penetration of a Rust-Oleum Fish-Oil-Based Protective Coating into Rust on Steel Specimens," prepared by Battelle Memorial Institute technologists. Clip the coupon to your letterhead for your copy. There is no cost or obligation.



RUST-OLEUM®

STOPS RUST!

Rust-Oleum is distinctive as your own fingerprint. Accept no substitutes. Be sure you get only genuine Rust-Oleum.

ATTACH TO YOUR BUSINESS LETTERHEAD
FOR YOUR COPY OF THIS THIRTY-PAGE REPORT

Rust-Oleum Corporation
2438 Oakton Street, Evanston, Illinois

☐ Please send me without cost or obligation the complete thirty-page report on Rust-Oleum penetration.

☐ Complete literature and color charts showing Rust-Oleum colors to match most equipment manufacturers' original colors.

☐ Nearest source of supply.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 275

(Continued from preceding page)

Personnel

Though the project was not scheduled to be completed until this July, good time on the grading enabled Koss to move in with paving equipment early and complete the entire project late last year. Supervising the work for W. J. Menefee Construction Co., Inc., were Chester Knight and William Morrow on the earthwork, and E. W. Menefee, Jr., in charge of rock production. The field engineer for the contractor was A. V. Carte. The work was done under the supervision of the Joplin District No. 7 of the Missouri State Highway Department, which has W. J. Eddleman as district engineer and J. H. Olin as resident engineer. C. C. Tevis is chief of construction engineer for the department and Rex M. Whitton is chief engineer. R. M. Marshall is district construction engineer. THE END

New plant started by Aero Design

A $1\frac{1}{2}$ million factory, providing an additional 126,000 square feet of space, is being built at the Oklahoma City facilities of the Aero Design & Engineering Co., Bethany, Okla. The new plant is rising on a 44-acre tract just south of the Tulakes airport in Bethany, a suburb of Oklahoma City.

Aero Design & Engineering, maker of the Aero Commander executive airplane, will move its entire air frame construction activities to the new plant this coming fall.

Wire rope record system

■ The Service-Score system for controlling wire rope costs is the subject of an illustrated folder from the Leschen Wire Rope Division of H. K. Porter Co., Inc. The system is a simplified method of keeping tabs on the length of service of wire rope. It is similar to the system used to record lubrication data on automobiles, trucks, and other vehicles.

To obtain this folder, along with a sample set of Service-Score stickers, write to the Leschen Wire Rope Division, H. K. Porter Co., Inc., 300 Park Ave., New York 22, N. Y., or use the Request Card at page 18. Circle No. 18.

The Leschen Service-Score sticker, applied to a convenient place on the equipment, records wire rope service information.

Vibrating roller unit

■ A vibrating roller that can compact 27 cubic yards of backfill per hour is described in a bulletin from the Essick Mfg. Co. The Model VR-28-W has a 28-inch vibrating roller and is self-propelled.

A comparison of the results obtained with a static-weight roller and those obtained with a vibration roller is included in the bulletin. General specifications for the 800-pound rig are also listed. The machine is powered by an air-cooled Wisconsin engine.

To obtain Form No. 4-L-8 write to the Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif., or use the Request Card at page 18. Circle No. 20.

Traffic control products

■ A catalog describing its complete line of traffic control products is available from the Cataphote Corp. The line includes street signs, traffic signs, and reflective coatings, beads, buttons, and striping. Also included in the brochure are sign posts and mounting hardware.

Most of the products are illustrated and detailed. A listing of standard sign wordings is included. Special wordings are available on request. Each section of the catalog is followed by a complete price list.

To obtain Catalog 65 write to the Cataphote Corp., 958 Wall St., Toledo 10, Ohio, or use the Request Card at page 18. Circle No. 19.

Indicator shows load, boom radius, capacity

■ A crane weight indicator that shows the total weight of the load being lifted, the boom radius from the king pin, and the lifting capacity of the crane at the particular radius

The Euclid TC-12 gives you more work-ability than other Crawlers

The first really new tractor concept in years... with ALL the performance features you've wanted

Euclid's Model TC-12 Twin-Power Crawler establishes an entirely new standard of tractor performance. It's built to deliver unequalled drawbar horsepower, easy operation and a smooth, steady flow of power to meet any job requirement. It provides easy accessibility of all major components and all lubrication, check and adjustment points are located for maximum convenience. Unitized assemblies permit service or removal without a major tear-down of other parts.

Powered by two 194 h.p. engines at rated speed, 365 h.p. is delivered to the power train. Each of the tracks is driven independently through separate Torqmatic Drives giving the TC-12 faster, easier steering and greater drawbar pull at higher speed. There's no clutch—shifting from one of the three speed ranges to another is done under full power—top speed in forward or reverse is 8.3 mph.

Have your Euclid dealer give you all the facts on the TC-12—compare with your present big tractor equipment and you'll know why so many owners have proved that *Euclids are your best investment.*

EUCLID

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM

is available from the Martin-Decker Corp. The Type SB-10 indicator is available in seven models with capacities of from 15,000 to 200,000 pounds.

The indicator consists of two systems. The first is built around a hydraulic pressure transformer and the second is built around a fluid reservoir. The pressure transformer is incorporated in the tackle system and carries a proportionate share of any load lifted. The load is transformed into a hydraulic pressure signal that is transmitted through a high-pressure hose to a gage located in the crane cab.

A second pointer on the gage is actuated by variation in the low-pressure system resulting from changes in boom elevation acting on the fluid reservoir, which is attached to the boom at a measured point.

The gage is located directly in front of the crane operator. All operations are fully automatic, except for tare weight adjustment and surge or damper adjustments. These adjustments are within easy reach of the operator.

For further information write to the Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif., or use the Request Card at page 18. Circle No. 29.

Compression tester has 30,000-pound capacity

■ A multi-purpose compression testing machine designed for routine and research compression and flexure testing of such materials as soils, asphalt, mortar, concrete and metals is announced by Soiltest, Inc. The Versa-Tester model AP-350 has a load capacity of 30,000 pounds and is said to be accurate to within one per cent of the indicated load.

Model AP-350 complies with ASTM specifications for hydraulic testing machines. The working mechanism is enclosed in a steel cabinet, the front and back panels of which are easily removed. The maximum specimen clearances are 12 inches wide by 18 inches high.

The Versa-Tester Model AP-350 is designed for compression and flexure testing of such materials as soil, asphalt, mortar, concrete, and metals.

The Versa-Tester requires a floor space of 28×24 inches and stands 6 feet high. Test loads are indicated on a dial fitted with a maximum load pointer. The loading rate is adjustable up to 6 inches per minute.

For further information write to Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill., or use the Request Card at page 18. Circle No. 258.

Scaffolds and ladders

■ Scaffolds and ladders for construction, concrete shoring, and building repairs are explained and illustrated in a general catalog from The Patent Scaffolding Co., Inc. Erection procedure, technical data, uses, and typical installations are given for each of the many types of built-up, suspended, and swinging scaffolds. Wood, aluminum, and magnesium ladders, as well as aluminum scaffolds are included.

To obtain this catalog write to The Patent Scaffolding Co., Inc., 38-21 12th St., Long Island City 1, N. Y., or use the Request Card at page 18. Circle No. 15.

Holmes & Narver appoints

John A. Brownlie has been appointed vice-president in charge of business development of Holmes & Narver, Inc., a Los Angeles, Calif., engineering and construction firm. Brownlie has had considerable experience as a surveyor and engineer, in addition to having held various supervisory positions with several companies, including that of project manager with Morrison-Knudsen of Boise, Idaho, during its construction of the Naval Ordnance Test Station at Inyokern, Calif.

In 1952, Brownlie became vice president and general manager of the operations of Macco Pan-Pacific, Inc. in Panama, Central America, and Puerto Rico, managing all phases of construction operations.

Years Ahead in Performance

on today's tough jobs!

Another job where the TC-12 proved its ability to get more work done faster—land clearing in Virginia. Excellent maneuverability in tight quarters, steady flow of power, and typical Euclid brute strength, make this Twin-Crawler a dependable top performer for this kind of big tractor work.

The TC-12 has no equal for pushloading large scrapers or pulling big earthmoving equipment. Each track is driven by a separate engine and Torqmatic Drive giving the Euclid tractor outstanding maneuverability. On their Indiana Turnpike contract, Union Builders kept the job ahead of schedule with a fleet of "Euc" scrapers pushloaded with the TC-12.

Compare the accessibility and performance of the TC-12 with your present big tractor equipment—your Euclid dealer has facts and figures from all kinds of jobs.

A. E. Dick Construction Co. is using 2 Twin-Power TC-12 "Eucs" for stripping overburden at a big open pit anthracite operation in Pennsylvania. Tremendous power and traction, unequalled in any other crawler, gives them more work-ability on tough jobs as well as on routine earthmoving work.

Equipped with a Tipdozer, this TC-12 proved a versatile machine on a big subdivision grading job. It pushloaded a fleet of big Euclid scrapers—getting heaped loads of 21 and more yards in a hurry—and did a lot of land leveling and clean up work itself.

Codell and Oman put their first TC-12 to work pushloading "Euc" Scrapers on a 3 million yard railroad job in Georgia. Independent track drive, good visibility for the operator and power matched to the job requirement enables the TC-12 to maintain maximum scraper production.

Easy operation of the TC-12—Torqmatic Drive eliminates master clutch and manual gear shifting—makes this "Euc" a high production machine. For a relocation project on U. S. Route 16 in Michigan, Sugden and Sivier used a cable controlled blade for dozing.

EUCLID DIVISION GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

← For more facts, circle No. 276

Technique corrects slides in more than 50 per cent of cases; installation cost ranges from one to five dollars per foot

Oregon finds horizontal drains economical

A problem that has long plagued engineers—the control and stabilization of slides—is more important today than ever before, particularly since roadbed widths are increasing and better alignments are requiring that heavier cuts and fills be made.

An approach to the problem has been made in Oregon with the use of the horizontal drain method, whenever conditions are suitable. Results so far have been satisfactory; more than 50 per cent of all slides were corrected whenever the method was used. The economical technique has shown itself to be particularly valuable in the western section of the state which has unstable earth conditions and is subject to heavy rainfall.

Drain design

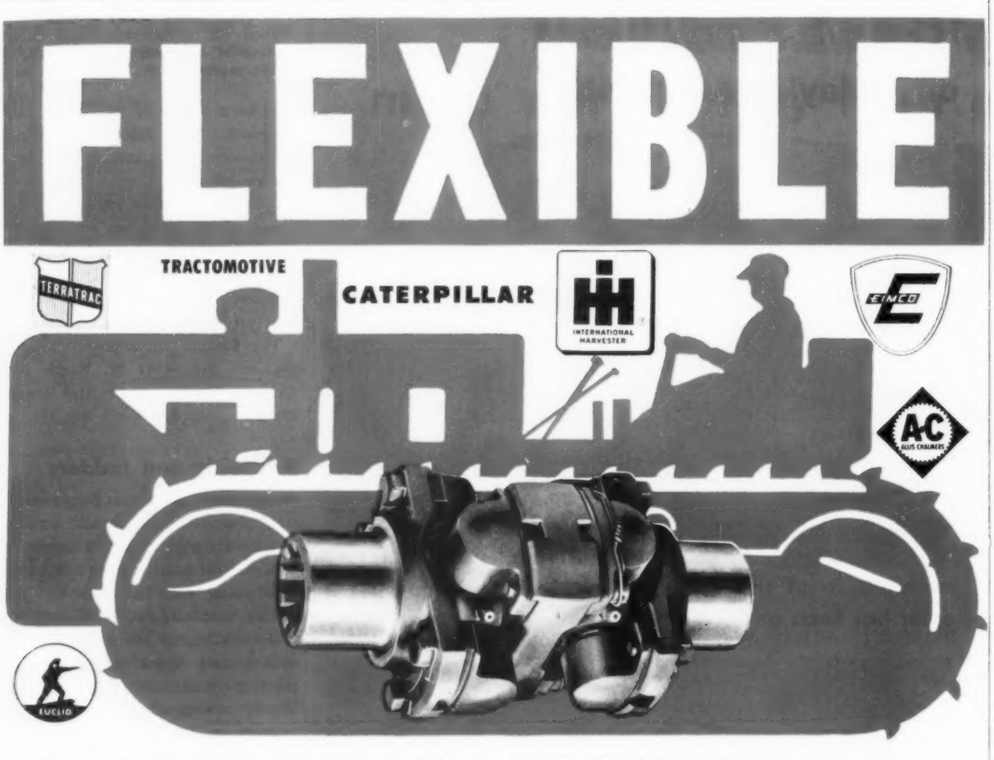
Instability can result whenever earth is disturbed by an excavation or construction of an embankment; all types of slides can take place, each having its own peculiarities and complexities and meriting a study of its own.

In general, the draining of highway cuts and fills is the same as that provided for earth dams. In the latter case, a provision is made for removing water seepage from the downstream face of the dam for, if water was allowed to accumulate, the soil mass would become saturated and there would be a reduction of shear values and possible failure of the dam itself. In earth dams, the drains are spaced according to the permeability of the soil and they go deep enough into the face of the dam so that the moisture in the soil above them is adequately controlled. This makes it possible for the shear values used in the design to be maintained.

More latitude is possible with highway drains. Tunnels and horizontal drains can be used; ditches can be made to intercept water; streams diverted; small surface lakes that feed water underground can be drained; and drainage systems can be placed before fills are constructed.

Part of the location survey on all Oregon projects involving a substantial amount of grading are geological and soil investigation studies to determine, insofar as possible, areas of potential instability. Danger signals can frequently be detected after a study has been made of excessively wet zones, old slide benches, leaning trees, springs, aerial photographs, and, if the work is on a relocation project, maintenance records.

Once an area is suspected, a detailed investigation should be made of the entire area. These investigations may require such work as digging vertical auger holes or shafts, checking fringe areas for water sources like lakes and streams, or using dye to check the migration of water from an upper area to the suspected zone. With geophysical exploration, it is possible to detect the horizons or layers of materials in the suspected zone. For this work, a test hole or exposed face is generally required for calibrating the instruments. A determination of the water



Modern Crawler tractor design requires a F-L-E-X-I-B-L-E connection between the engine and transmission. MECHANICS Close-Coupled Type UNIVERSAL JOINTS not only provide for high angularity within cramped space but compensate for out-of-alignment conditions. The shocks and strains that crawler tractors encounter in heavy duty work often are so great that they temporarily twist the tractor frame. MECHANICS Close-Coupled Type UNIVERSAL JOINTS are designed to provide the F-L-E-X-I-B-I-L-I-T-Y needed to make efficient operation possible under such adverse conditions. MECHANICS exclusive KEY method of driving has the highest safety factor, transmits the most torque, and averts costly breakdowns that result from driving through bolts or screws that work loose. Let our engineers show you how these MECHANICS advantages will benefit your product.

MECHANICS UNIVERSAL JOINT DIVISION
Borg-Warner • 2030 Harrison Ave., Rockford, Ill.

MECHANICS
Roller Bearing
UNIVERSAL JOINTS
For Cars • Trucks • Tractors • Farm Implements • Road Machinery • Aircraft • Tanks • Busses and Industrial Equipment

For more facts, use Reader-Reply Card opposite page 18 and circle No. 277

by FORREST COOPER, Deputy State Highway Engineer, Oregon State Highway Commission

table or of layers of clay or slip planes may form part of the investigation.

Because of the difficulty of developing adequate information as to underground water conditions and slip planes, a sloping ground line offers the most difficult foundation for an embankment. A very small amount of water, impounded by foundation soil that is compressed by a new fill, can build up so that the fill becomes saturated. If this condition persists, there will be a slide when the shear strength is reduced to a value less than that required for stability.

Various methods

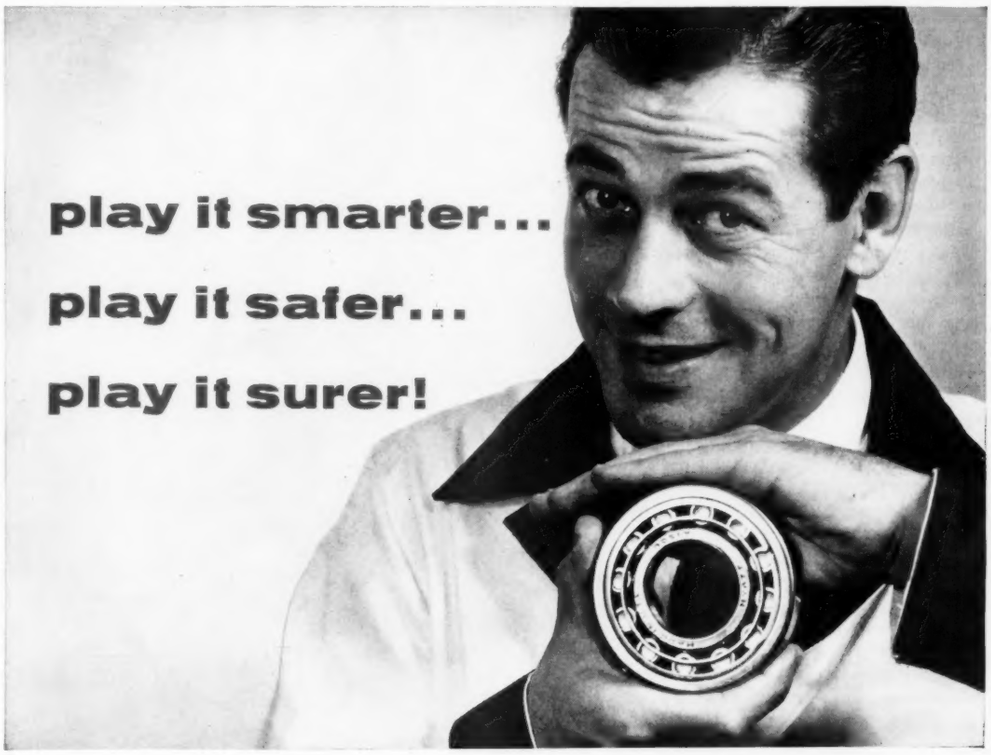
In considering the drainage system to be used in the design of a fill, thought should be given to all of the various methods, then the one best suited to the specific problem selected. Granular materials, placed in the lower area of an embankment, will often act as a drain for the overlying soil. It will also provide a means for draining water that rises vertically behind the fill—due to the weight of the embankment—and destroys the permeability of the underlying soil. Benches may be constructed and a blanket of granular material, drain pipes, or both be used to provide drainage. Tunnels may be used, but because of their cost, they are generally employed only to correct failures that respond to no other treatment.

Even after all reasonable preventative measures have been employed, failures sometimes occur during and after excavation of the placing of a fill. Such failures frequently respond to the horizontal drain treatment, a method that is comparatively economical except in cases where rock is encountered. Even in such cases, this system is often less costly than any other. The location and spacing of holes depends upon conditions at the site. An average spacing is 20 to 40 feet. An alternate method is to drill three holes from one set, using a fan pattern.

A compromise must be made between the cost and average conditions of stability in selecting the slope to be used in a cut section. A cut that was designed for 1½ on 1 slopes may develop zones of weakness not apparent before excavation or during or after construction. Slides that take place under these conditions are generally the result of ground water and frequently can be corrected economically by the installation of horizontal drains.

Calculated risks of slides should not be taken on fill sections, because corrective work will be complex and a danger will exist for the traveling public. Cut slides can ordinarily be corrected faster and under more favorable conditions.

The installation of horizontal drains can be done with a minimum of delay since the equipment used is very mobile and adaptable to emergency conditions. Often, drillers can begin an effective horizontal drain installation during grading work. Under favorable conditions, drilled drains can be installed for as little as one dollar per foot with auger equipment. Such costs permit a program of probing for suspected water zones. Often a slide is stabilized with the removal of a seemingly small volume of water. But a great quan-



Always replace a HYATT with a HYATT!

You're *both* smarter and safer when you replace with exactly the same bearing the manufacturer specified for the application.

YOU'RE SMARTER because it means savings in time and trouble. Hyatt Hy-Rolls are precision-built and require no fitting adjustments—they're *completely interchangeable!*

YOU'RE SAFER because you're sure of a dependable job—the same trouble-free performance originally built into the equipment!

Insist on HYATT Hy-Rolls—you're insisting on the lowest bearing cost per hour of service! Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

Watch "WIDE WIDE WORLD" Sundays on NBC-TV

GM GENERAL MOTORS

Always look for the familiar blue and yellow box —when it comes to quality, there's no substitute for

HYATT HY-ROLL BEARINGS FOR REPLACEMENT

For more facts, use Reader-Reply Card opposite page 18 and circle No. 278

tity of water can be ponded over a period of time. In fact, it is rare to find drain pipes carrying a large quantity of water continuously. A 1¼ or 1½-inch pipe is almost always capable of carrying intercepted water. If the volume to be carried is high, additional drains can be installed in the adjacent zone.

Different pipe

There are several types of drain pipe acceptable for horizontal draining. The size of the drilled hole and the method of inserting the drain pipe are the prime factors influencing the type of drain pipe used. The type and character of material involved will dictate the size and type of drill equipment to be used.

Oregon uses a 6-inch concrete drain tile in combination with auger-type equipment. An 8-inch auger clears a 6-inch tile and the hydraulic feed on the drill pushes the tile into the hole.

Galvanized or black iron pipe is used in drill holes less than 8 inches in diameter. The usual size is 1½-inch, but a larger size is used if it is warranted by conditions. All metal pipe has a copper or brass tag attached, stamped with the total length of the completed pipe drain.

Metal pipe can be perforated on the job with an acetylene cutting torch, though suitable perforated drain pipe is also available commercially. Sizes range upwards from 2 inches in diameter.

Several types of equipment are available for horizontal drilling. There is also a great variety of cutting heads, including continuous flight augers, diamond drilling equipment, and hydraulic rigs.

Continuous flight augers capable of making holes up to 12 inches in diameter and usually not over 8 inches in diameter go as deep as 150 feet. Generally, holes are under 100 feet. This equipment is recommended for soil or soft rock formations. The hardest material to drill is soil with a high clay content. This type of soil is usually damp and, in this condition, it tends to offer high shearing resistance throughout the entire auger flight because of the plug of material contained within the entire flight. Shales and some soft sandstones or decomposed rock can be drilled, but penetration rates vary. Generally, the cutting head on augers is composed of steel teeth, coated with a hardfacing. These teeth are inserted into the head and held in place by specially designed wedges.

Diamond drills

Diamond-drilling equipment is used in rocky formations and can be used in soils, preferably through drill casing. Diamond drills for this type of work should be rugged and have a hydraulic feed on the drill head. If the drill is to work in soil, it should be capable of handling a casing of sufficient size so that the drain pipe can be inserted. The casing is later pulled out. The size of drain pipe may vary, but 1¼-inch or 1½-inch pipe will usually suffice. Several types of cutting heads of almost any diameter are available for rock drilling, and depths of 300 feet are possible.

The diamond bit should have a diameter large enough so that the drain pipe can be inserted in the completed hole. The bits with larger diameters are best for highly jointed rock formations. The type of rock is important when diamond bits are ordered. The number of waterways, size and quantity of diamonds, and the matrix used in setting the diamonds depends on the texture, hardness, and jointed condition of the rock to be drilled.

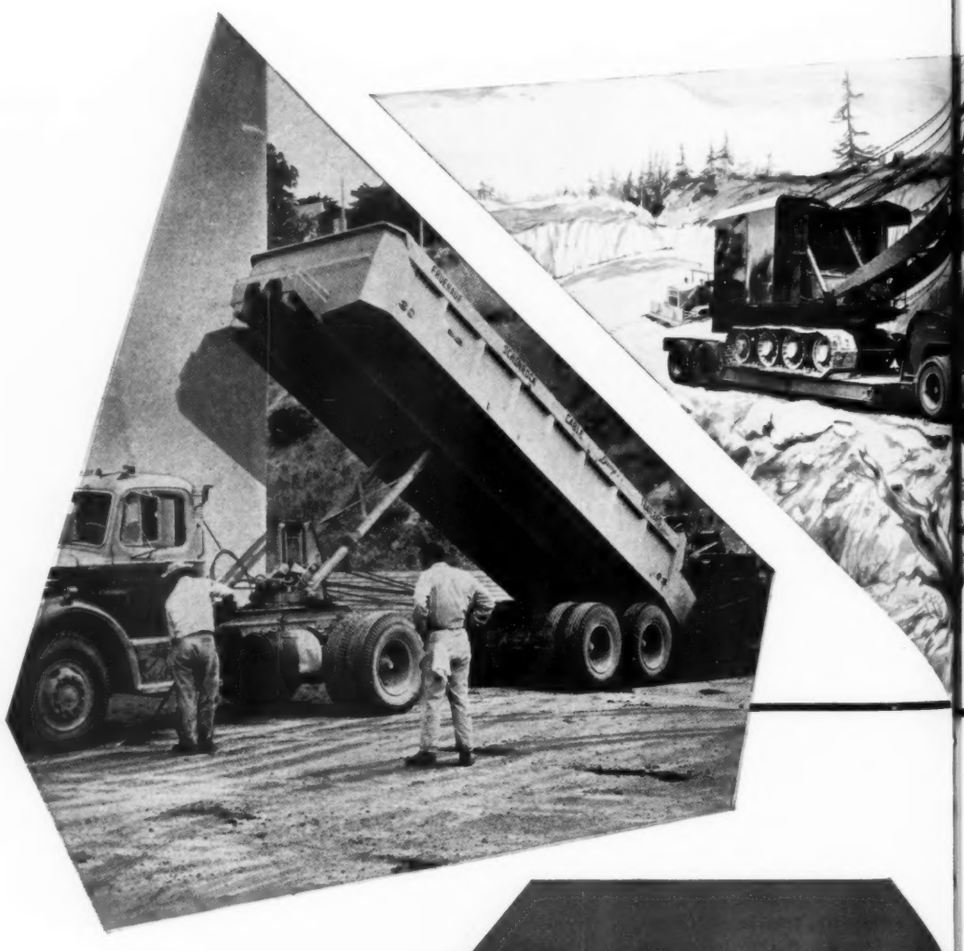
Rotary or oil-field-type bits can be used on all types of rock and soil. Their diameter is small, or generally the minimum diameter available from the manufacturer, which is about three or four inches. Various types of alloy steel bits are also available for use on different formations.

Water or air may be used for diamond drilling. Power should be supplied from a separate unit and not from the drill, and high pressures must be maintained at all times. If the power unit of the drill is used, the air or water pressure will fluctuate with the rotating speed of the drill rod and during the peak use of power for drilling operations.

Hydraulic rigs

Hydraulic equipment, used to push drain pipes into soil formations, may be used with or without casing. Water jetting may be employed to assist the penetration of the casing or drain pipes. The size of the hole and the depth of penetration depend upon the equipment.

Best results are obtained with a regularly trained crew. Since the installation of horizontal drains entails procedures and practices not common to usual drilling, this crew will



FRUEHAUF TRAILERS
"ENGINEERED TRANSPORTATION"

World's Largest Builder of Truck-Trailers
FRUEHAUF TRAILER COMPANY
10960 Harper Avenue • Detroit 32, Michigan
✓ PLEASE SEND THE FREE LITERATURE ON FRUEHAUF CONSTRUCTION TRAILERS AT ONCE!
NAME_____
COMPANY_____
ADDRESS_____
CITY_____ STATE_____
☆ *Fill in or just attach to letterhead and mail.*

THE EFFICIENCY OF YOUR
CONTRACTORS AND ENGINEERS

become more valuable as it gains experience. Oregon has found it advantageous to train and carry drill crews in the highway department organization.

A drill should always be set up rigidly, for if it shifts during the drilling operation, the direction of the drill line cannot be controlled. The drill must be placed as close to the drilling face as possible. If there is too much distance between the face and the drill, there will be vibration, the direction of the drill line will be difficult to hold, and the equipment will be subjected to undue stresses.

Particular care should be taken in starting a new drill hole, since the first 10 feet can determine the degree of control of the drill line. The bit and drill rod must be watched very carefully. The drill bit must always be centered in the hole and the rod must follow through the head of the drill without stress. Should there be any movement when a hole is started, the drill should be adjusted to fit the new line or a new hole should be started. During this phase of work, a reduced drilling speed is best. Such things as rpm pressure and the type of bit—it may be necessary to change types during drilling—should be left to the discretion of the operator.

Types of soil

Rock or soils containing rock are the most difficult and expensive materials to drill. If a wet clay soil is drilled, a considerable amount of power will be needed by auger type equipment. Such soil lacks cohesion, and the hole closes in on auger flights and develops a condition of shear through the entire drill line.

A fragmentary rock type of soil is generally a good draining soil. The difficulty is in locating and collecting the water that may cause damage. Some objection is raised regarding the use of water in rock drilling, since the complete flow of water pumped through the drill line sometimes dissipates into the slide mass and helps weaken an area. Under such conditions, some consideration may be given to sealing the drill hole with clay or other prepared material so that the drill water will return to the drill face.

A clay soil, being impervious, is very difficult to drain. But it is often necessary to drill through clay to reach a water zone. Often a clay zone will contain a perched water table or underground lake. Such a formation will permit surrounding soil to become saturated slowly unless the water is drained. If exploratory drilling indicated no pervious material beyond the clay zone, other methods of correction should probably be employed.

A silt type or granular soil offers varying degrees of drainage to a horizontal drain system. Such formations are much more pervious than clay-type soils and often are the carriers and recipients of the excess water.

Comparative costs

Records of work done in Oregon show that horizontal drains can be installed at costs of $1 to $5 per foot. The lesser figure is for ideal conditions—in soil—and the larger for fragmentary rock formations drilled with tri-cone and diamond bits.

The basic unit cost of tunnels is $25 to $50 per foot, and as the work is largely exploratory, final costs are frequently extremely large. The original plan is often expanded to explore and drain larger areas. Very often the water drained by such a system could be carried by a surprisingly small pipe. The maintenance of a tunnel can result in a continuous cost; sometimes it is found best to install a drainage system and refill the tunnel.

The lower cost of horizontal drilling makes it possible for additional holes to be drilled at a cost that does not even approach that of tunneling. And the volume of water collected by the tunnel method can generally be handled readily by horizontal drains. One final advantage: drilling offers an exploratory tool at a reasonable cost. THE END

(From a paper "Slide Stabilization by the Horizontal Drain Method", presented by Forrest Cooper at the meeting of the American Association of State Highway Officials in Atlantic City, N. J.)

Wade & Co. forms division

R. M. Wade & Co., Portland, Oreg., has formed a new Construction Equipment Division to be supervised by H. D. Smith, who has appointed Stephen C. Munsell special Industrial Division representative.

Wade & Co. is an equipment distributor in the Pacific northwest, and is also a manufacturer of couplers and sprinklers. The firm has acquired the line of machinery manufactured by the Pippin Construction Equipment, White River Junction, Vt.

← For more facts, circle No. 279

MONEYMAKERS

All roadbuilding contractors should be aware of the sizeable economies now made possible by innovations in roadbuilding Trailers in the complete Fruehauf line.

The new *Winchless Removable Gooseneck Carryall,* for instance, cuts front end unloading of heavy cranes and shovels to less than 15 minutes. The moneymaking *Fruehauf-Schonrock Cable Dump,* economical in cost and maintenance, delivers up to 4,000 lbs. more sand or gravel than conventional dumps, and is simple in design and operation. The *Airslide* Bulk Cement Transport* unloads cement or other pulverized materials at the rapid rate of 10 to 15 barrels per minute — with no mechanical device touching the commodity.

These provisions for speed, simplicity, and operating economy add up to increased profits every day, right now, for roadbuilding contractors. Send for illustrated literature!

*Trademark—Fuller Co.

FRUEHAUF FLEET IS PART OF YOUR ROADBUILDING PROFIT!

Revised steel data book

■ A revised edition of the 256-page pocket-size steel data book published by Joseph T. Ryerson & Son, Inc., is available from the company. The new edition gives information on machining and fabricating, specifications and tolerances, weights and dimensions, and elements and safe loads. Tables, definitions, and general data are also included.

The book is a companion of the Ryerson steel stock list and is recommended for purchasing agents, engineers, and shop men.

To obtain this book write to Joseph T. Ryerson & Son, Inc., 2558 W. 16th St., Chicago, Ill., or use the Request Card at page 18. Circle No. 82.

Diesel power units

■ Power units and fan-to-flywheel engines made by the Detroit Diesel Engine Division of the General Motors Corp. are described and illustrated in a new brochure from the company. Covered are horsepower ratings, dimensions, and accessory information on single and multiple-engine models ranging from 56 to 761 rated brake horsepower.

To obtain this brochure write to the Detroit Diesel Engine Division, General Motors Corp., 13400 W. Outer Drive, Detroit 28, Mich., or use the Request Card at page 18. Circle No. 83.

Prestressed shoring

■ A catalog on Spanall prestressed all-metal horizontal shoring for all types of beams and slab concrete floor forms is available from Spanall of the Americas, Inc. The catalog contains descriptions of the product, including all essential engineering and application data.

Detailed isometric drawings and two pages of photographs illustrate typical installation techniques. On the back cover is a pair of reference charts which will help the builder in two ways.

The charts will help him quickly determine the most economical combinations of Spanall sections to attain various span lengths. They will also aid in determining the correct relationships between slab thickness, slab weight, length of span, and spacing between supports.

To obtain this catalog write to Spanall of the Americas, Inc., 787 United Nations Plaza, New York 17, N. Y., or use the Request Card at page 18. Circle No. 81.

Surplus equipment

■ Surplus equipment is detailed in a new 60-page catalog from the Groban Supply Co. Included are newly manufactured and surplus generators, hydraulics, motors, pumps, transformers, and cylinders.

To obtain this catalog write to the Groban Supply Co., 1139 S. Wabash Ave., Chicago, Ill., or use the Request Card at page 18. Circle No. 78.

Bit, rod shop equipment

■ Bit and rod shop equipment manufactured by the Ingersoll-Rand Co. is detailed in a brochure from the company. The equipment is recommended for fast and economical bit and steel reconditioning wherever large-scale rock drilling operations are carried on.

I-R offers a complete line of jackbit grinders for small and large Carset bits and small steel bits. Drill steel and bit furnaces for heating to forging temperature and for tempering are also part of the equipment offered. Drill steel sharpeners, steel cutters, and shank grinders round out the line.

To obtain Form 4187 write to the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., or use the Request Card that is bound in at page 18. Circle No. 80.

Equipment lubricants

■ A bulletin entitled "Keystone Specialized Lubricants For Contractor Equipment" is available from the Keystone Lubricating Co. The bulletin deals with lubricants for use on earthmoving, quarrying, roadbuilding, excavating, dredging, and erecting equipment.

The application of Keystone grease and oil to 24 different types of heavy equipment is described. Two specification charts are included. The first deals with semi-solid lubricants and gives working range, melting point, penetration, moisture repellence, and body characteristics. The second covers liquid lubricants and lists such data as flash and cold tests and SAE numbers.

To obtain Bulletin BU-58 write to the Keystone Lubricating Co., 3100 N. 21st St., Philadelphia 30, Pa., or use the Request Card at page 18. Circle No. 79.

Two NEW BIG BONUS International

with fast-loading, dirt-heaping, clean-

Now...all the advantages of famous International scraper design are available in two new towed scrapers—to turn big International crawler power and traction into *big-bonus yardage*. The new 20 cu yd heaped 4S-85 is matched in weight and capacity with the giant TD-24 to pile up profits on the fill. The 14-yard heaped 4S-55 is a cycle-speeder behind TD-18 heavy-duty pull!

Turn on International crawler power with one of these new scrapers—and watch the dirt boil in freely—compact itself into corners—build up an extra-yardage heap. These new scrapers have *flush-smooth* bowl interiors for *flow-easy* dirt action. You've never seen such fast, easy, big scraper loading! And outside-mounted apron arms insure super-speedy, load-trapping apron action!

Ground-hugging profile and low draft arm connections give these new International scrapers an amazing new load-heaping line of draft—plus greatly increased *all-speed* stability for rough-terrain hauling! Roll-out ejection assures fast dumping, and positive discharge of wet, sticky material!

Study the extra yard-getting features of these new big-capacity scrapers from the new balanced, easy-hitch tongue to the big-target push-block. Ask your International Construction Equipment Distributor for a demonstration.

INTERNATIONAL HARVESTER

INTERNATIONAL®
Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

Digital computer

■ An illustrated bulletin describing the Bendix G-15D general-purpose digital computer and its digital differential analyzer accessory is available from the Bendix Computer Division of the Bendix Aviation Corp. According to the bulletin, the versatility and range of operations of the computer are considerably increased by the addition of the optional accessory. New programming techniques and a complete new line of input and output equipment are also described.

To obtain this bulletin write to the Bendix Computer Division, Bendix Aviation Corp., 5630 Arbor Vitae St., Los Angeles 45, Calif., or use the Request Card at page 18. Circle No. 86.

Dust control systems

■ Specially engineered systems of controlling dust in rock crushing plants are described in a new brochure from the Johnson-March Corp. Illustrated are important points where the systems, known as Chem-Jet, can be applied.

Among these points are the truck dump, the primary and secondary crushers, the screens, the bucket elevators, the conveyor transfer areas, and the storage pile.

The folder details the advantages of the systems and explains how they suppress dust at its source. Equipment and Compound M-R, a surface active agent used with the systems, are also described. Photographs show the effectiveness of this dust control method with systems turned on and off. Reference is made to special scrubbers for asphalt plants as well as to the company's engineering services.

To obtain this brochure write to The Johnson-March Corp., 1724 Chestnut St., Philadelphia 3, Pa., or use the Request Card at page 18. Circle No. 85.

Air-controlled truck crane

■ The Model 35-M 25-ton truck crane is detailed in a catalog from the Marion Power Shovel Co. The new rig features full air controls and a completely independent boom hoist.

The catalog explains such design and construction features as the air controls, the boom hoist, the large-diameter swing clutches, and the high-visibility cab. Such optional equipment as a high gantry and a torque converter are also described. A diagram and explanation of the optional power-handled ballast is included.

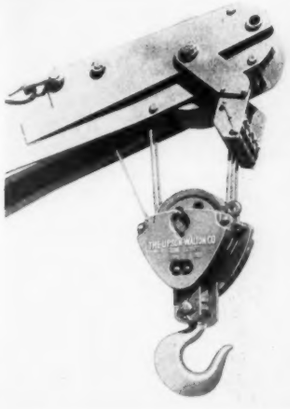
Complete specifications and capacities of the rig are given for crane, dragline, or clamshell operation.

To obtain this catalog write to the Marion Power Shovel Co., 2 Cheney Ave., Marion, Ohio, or use the Request Card that is bound in at page 18. Circle No. 84.

Lifting limits increased by new crane hook block

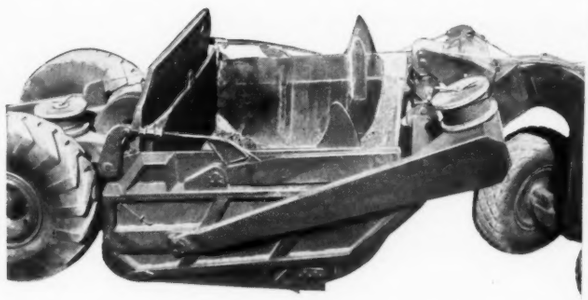
■ A crane hook block for mobile crawler and rubber tire cranes which affords new maximum lifting limits is announced by the Upson-Walton Co. Called the Max-Lift, the new block is shorter than conventional crane hook blocks, yet is said to be able to withstand the most severe operating conditions. The new block is available in six models to cover capacities of from 5 to 30 tons.

The Max-Lift is said to reduce the danger of twisting and damaging the hoisting lines and to permit loads to be positioned by one man. This is possible through the use of roller or bronze thrust bearings. A drop-forged movable steel trunnion eliminates the need for swinging the entire block into the hooking position. The steel swivel may be rotated into hooking position for a fast, easy connection.



Higher maximum lifting limits are possible with the new crane hook block for mobile crawler and rubber tire cranes announced by the Upson-Walton Co.

For further information write to the Upson-Walton Co., 12535 Elmwood Ave., Cleveland 11, Ohio, or use the Request Card at page 18. Circle No. 87.



New fast-loading bowl design is obtained with a low rear apron contour that gives positive, built-in dirt-boiling action under all loading conditions. Even the wearbars protecting tilting floor hinge are blended into cutting edge bed—to insure smooth dirt flow!

New cutting edge, where boiling action begins, consists of three equal-length, completely *interchangeable* and *reversible* sections. This design simplifies your parts inventory! And the cutting edge depth can be quickly changed to three different positions to match soil conditions and increase loading efficiency!

US YARDAGE

al Scrapers

an- dumping design!

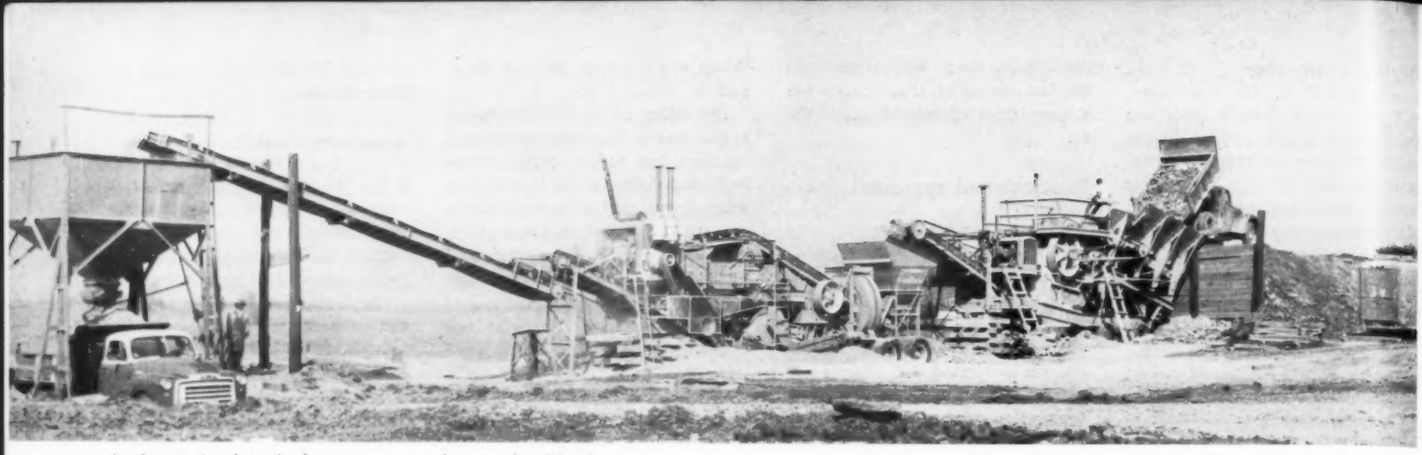
Exclusive power-saving double ball bearing sheaves maintain correct sheave alignment—provide increased cable and sheave life in these new scrapers. Below, it's the new 20-yard model "85" International scraper being self-loaded by a TD-24 crawler.

BRIEF SPECIFICATIONS:

Model	Recommended Tractor Size	Capacity Struck	Capacity Heaped	Capacity (with Sideboards) Struck	Capacity (with Sideboards) Heaped	Shipping Weight (Approx.)
4585	TD-24	16	20	19	22	37,200
4555	TD-18	10	14	12	15	26,360

Controlled, even spreading is accomplished by positive, power-saving roll-out ejection. High-lift apron, opened by ejector, eliminates excessive sheave travel and complicated reeving. All four axles of these new scrapers are individually replaceable, to minimize downtime, reduce repair expense! Below, the model "55" and TD-18 on the fill.

← For more facts, circle No. 280

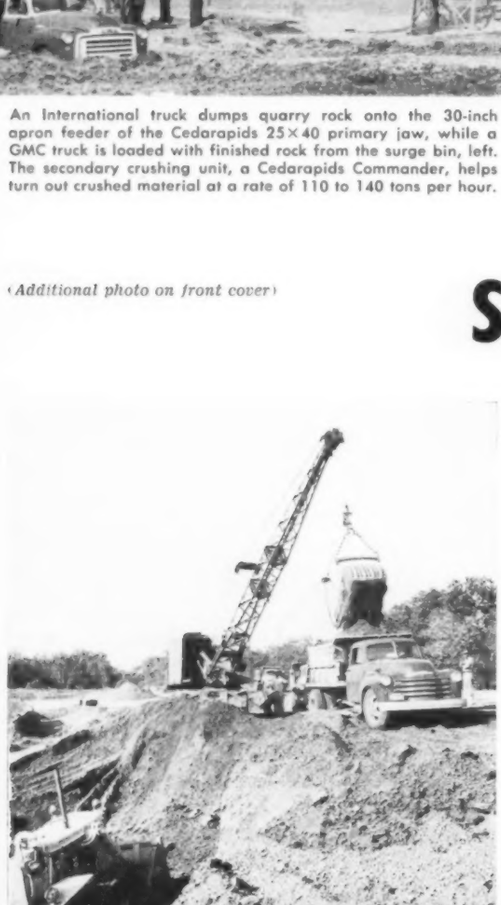


An International truck dumps quarry rock onto the 30-inch apron feeder of the Cedarapids 25×40 primary jaw, while a GMC truck is loaded with finished rock from the surge bin, left. The secondary crushing unit, a Cedarapids Commander, helps turn out crushed material at a rate of 110 to 140 tons per hour.

(Additional photo on front cover)

Sand, gravel, and rock blended for turnpike base

Techniques of building uniform base for 88-mile road vary; one contractor handles all operations from quarrying to compaction



Pit-run gravel that fits well into the base blend, and required little stripping of overburden, is loaded into a Chevrolet truck by a Lorain ¾-yard truck-crane with Hendrix 1-yard dragline bucket. The Cat D6 pushes the material up to the dragline.

Continuing the rapid pace set by the grading contractors on the Oklahoma Northeastern Turnpike, a number of paving contractors streamed to the site with truckloads of several types of materials to build up the base and subbase and get ready to start bituminous surfacing.

In effect an extension of Oklahoma's Turner Turnpike, which runs between Oklahoma City and Tulsa, the Oklahoma Northeastern Turnpike runs 88.52 miles northeasterly to the Missouri State line near Joplin, Mo. Here it joins Missouri Highway 266, which was built by the State of Missouri to link Joplin and the new turnpike. (See pg. 80)

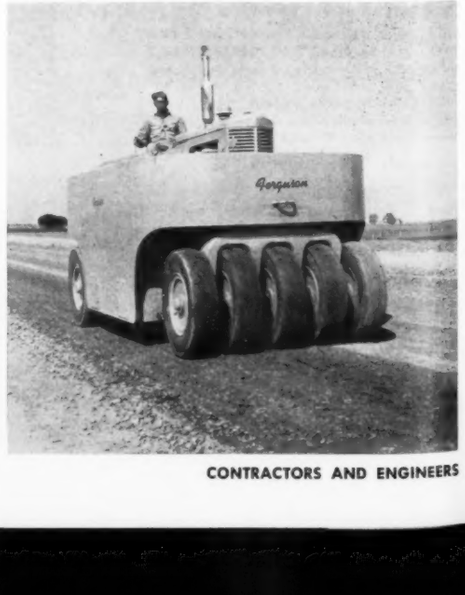
Though the several contractors on this work took advantage of the most economical and available materials for base construction, they used different materials and methods to complete the 12-inch course of select subgrade, the 7-inch base course, and the 5-inch bituminous concrete surfacing. This paving is uniform throughout the stretch, but at interchanges the road consists of a 12-inch course of select material on the subgrade, a 4-inch sand cushion, and 8 inches of portland-cement concrete surfacing.

Two 24-foot paved roadways, separated by a 15-foot raised grass median and flanked by 12-foot paved

Crushed rock is dumped on the roadway by a Ford F600 with a Marion truck body. The pit-run gravel has already been deposited.

A Caterpillar No. 12 motor grader shapes the piles dumped by the trucks into a windrow before starting mixing operations.

This self-propelled Ferguson 25-ton pneumatic-tire roller helps compact the base on the stretch being constructed by Broce Construction Co., Inc., Woodward, Okla.



shoulders, make up a typical cross section of the turnpike. All cross roads are carried over or under. Five interchanges or through the barrier-type toll gates at each end provide access to the road.

Blend of stone, sand, gravel

On a typical operation near Big Cabin, Broce Construction Co., Inc., Woodward, Okla., laid a mixture of crushed rock, pit-run gravel, and sand for the base. This contractor carried on all of the operations—from the quarrying of the limestone through the blending and consolidation of the finished base. Some of the other contractors used local commercial sources for one or more of the base-course ingredients.

The mixture used by Broce consisted of 40 per cent pit-run gravel from a pit about 11½ miles from the job, 40 per cent crushed limestone from a quarry about five miles away, and 20 per cent sand from a pit within two miles of the road. These materials were produced and hauled to the road separately, then blended by motor graders, watered, spread, and compacted.

To obtain the crushed-rock portion of the mix, Broce opened a quarry in a limestone deposit a short distance east of the job site. After stripping the relatively shallow overburden with scrapers and dozers, the contractor used a Cleveland wagon drill powered by a Chicago-Pneumatic 365-cfm Power Vane compressor to drill 1½-inch holes to a depth of about ten feet. The rock was broken down by Hercules 60 per cent dynamite.

A shovel loaded the blasted rock into the International and Chevrolet trucks that hauled to the 30-inch apron feeder of the primary crushing unit—a Cedarapids 25 × 40 jaw crusher powered by a GM 6–71 engine. Crushed material was discharged to the secondary unit on a 30-inch belt conveyor.

Screening and secondary crushing were done in a Cedarapids Commander unit powered by a GM 110-series engine. The 42-inch × 10-foot double-deck screen and the roll crusher of this unit were arranged in closed circuit so that all oversize was recirculated through the rolls until it had been crushed down to an acceptable size.

The finished material, produced at a rate of from 110 to 140 tons per hour, was carried by a 24-inch belt conveyor from the secondary plant to a 21-ton elevated surge bin.

Though pit-run gravel for the mix came from a deposit located some distance from the job, this pit was worked because very little stripping was required and because no screening was needed to make the material fit well into the base blend.

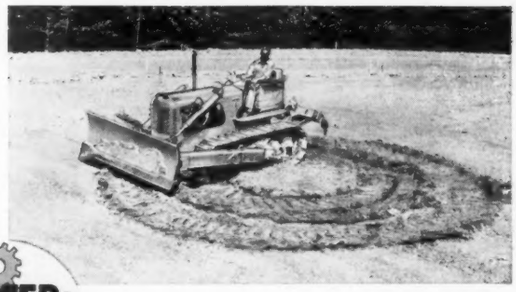
At the pit, a Lorain ¾-yard truck-crane powered by a GM 4–71 engine and equipped with a Hendrix 1-yard

(Continued on next page)

Three stages of the subbase finishing and compaction operations are done simultaneously. The Minneapolis-Moline diesel tractor at left pulls a Tampo double sheepsfoot roller to compact the lift. The Cat No. 12 grader cuts the base to finished shape and grade. The John Deere diesel tractor pulls three 13-wheel rollers —a Tampo and two Bros units—for final compaction.

New POWER-TURN Steering
gives you tighter turns with two-track power

Look at that turn! That's what a tight turn looks like with *full power on both tracks.* It means 100% working power at all times, even on the sharpest turns. It means added work capacity. It's POWER-TURN steering—another exclusive Oliver development.



POWER-TURN

OLIVER OC-12

...More push for your profits, too!

With 53 drawbar h.p., the OC-12 is one of the most powerful tractors of its class. Now POWER-TURN makes it pay still bigger dividends. You sweep through turns of *any* radius with full load. Or hold a straight line in angle dozing with the heaviest off-center loads.

Yet POWER-TURN is actually simpler. Two interconnected systems of control provide planetary reduction gears on each track. Here is the maximum in efficient flow of power, 100% tractive turns, better maneuvering. Operation is easier, too, with finger-tip controls to take all the muscle out of it.

In addition to POWER-TURN, the new OC-12 offers new over-center hand clutch and foot brake for greater operator convenience. Why not sit at the controls yourself and see the difference? Your Oliver distributor will gladly demonstrate. Call him today.

THE OLIVER CORPORATION
400 West Madison Street, Chicago 6, Illinois

OLIVER

A COMPLETE LINE OF INDUSTRIAL WHEEL AND CRAWLER TRACTORS AND MATCHED ALLIED EQUIPMENT

For more facts, use Reader-Reply Card opposite page 18 and circle No. 281

Limestone for base material is drilled in a quarry about five miles from the work site by a Cleveland wagon drill powered by a Chicago-Pneumatic 365-cfm Air Vane compressor. The drill is attached to a Le Roi Tractair which moves it from place to place.

(*Continued from preceding page*)

dragline bucket loaded the gravel into a fleet of rented trucks. A Caterpillar D6 tractor-dozer at the site pushed material up to the dragline.

Sand, the third ingredient of the mix, was loaded out from a pit near the job by an Allis-Chalmers HD-9 tractor equipped with a 2-yard Trac-to-Shovel.

Before placing the base material, Broce hauled in select sandy material from a nearby pit to make up the 12 inches of subbase. This was placed in 6-inch layers, bladed by a Cat No. 12 motor grader, watered, and compacted. A double Tampo sheepsfoot roller worked along with the motor grader compacting the material from the bottom. The surface was then rolled by three 13-wheel rubber-tire rollers pulled in tandem by a John Deere diesel tractor. Two of these were Bros rollers, the third was a Tampo.

A Caterpillar DW10 tractor-scraper moved the material around to assist the motor grader in obtaining a perfect grade. Excess material was picked up by the scraper and hauled to low points. As the subbase was completed, this DW10 tractor was uncoupled from the scraper and attached to the Grace 50-ton rubber-tire roller that did the final test rolling before the start of base-laying operations.

Base blended on road

When the subbase was at proper shape and grade and thoroughly compacted, the gravel trucks began delivering pit-run gravel to the road. Load stakes guided the truckers as they dumped their loads to get proper distribution of the material. Caterpillar No. 12 motor graders then blended the gravel into a uniform windrow. After crushed rock and sand had been placed in a similar manner, the motor graders began the blending operation, moving the material back and forth across the roadway. During the mixing process, water was added to the material by two Chevrolet trucks—one carrying a 1,500-gallon tank, the other a 2,000-gallon tank—and a Ford 4,000-gallon trailer tanker. The latter was equipped with a Deming pump that forced water through two flush noz-

Dependable All-Wheel traction

One of 9 reasons why you'll find International Trucks cost least to own!

Here are 4-wheel-drive and 6x6 trucks that need no roads. They make their own with all wheels *working*.

You get dependable sure-footed traction and extra pulling power to go through sand, mud and snow . . . up the steepest grades with a full load. No need to take the long way around. Ideal for highway hauling, too.

Every INTERNATIONAL All-Wheel-Drive model is completely factory-built for reliable performance and lasting economy . . . built to cost *least* to own.

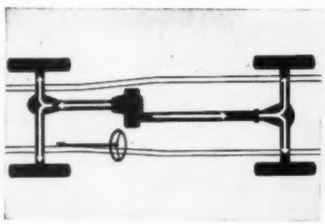
And fleet cost records prove* that INTERNATIONAL Trucks *do* cost least to own.

Why not start *saving* more, *earning* more money right now with the rough-and-ready truck that goes everywhere. Your INTERNATIONAL Dealer is the man to see.

**Signed statements in our files, from fleet owners throughout the U.S., back up this statement.*

INTERNATIONAL HARVESTER COMPANY, CHICAGO
Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

1 **All wheels are working** for you with this INTERNATIONAL 6 x 6. Get to places never before possible. Rough terrain and hills are easily negotiated. Save valuable time and money. Models for every job, 7,000 lbs. to 43,000 lbs. GVW.



2 **Two-speed transfer case** transmits power from the transmission to front and rear axles or rear axle only. Quiet, cloverleaf design for straight-thru drive, extra dependability and lowest maintenance. Full torque power take-off available.

3 **Brakes with big lining areas** are the self-energizing type for low pedal pressure and sure stops. Sealed to keep out dirt and moisture for greater dependability and reduced service. Power brakes standard or available on all models.

4 **Every cab is a full-sized beauty.** Plenty of leg and head room, 3-man-wide seats. Sturdily constructed with double back walls. Special cab mountings, rugged understructure and bracing to stand up under the most extreme conditions.

5 **INTERNATIONAL Steel-Flex frames** are constructed with cold squeezed rivets for added strength and durability. S-120 (4x4) models have kickup for extra low loading height. Larger models have full load-length reinforcements.

6 **Easy, positive steering** with over-size cam and roller-mounted twin lever gears. Controls mounted ahead of the front axle. You get greater stability, less shocks, comfortable steering angle . . . best handling on all types of terrain and roads.

Smith Brothers Construction Co., ...ble, Okla., uses a semi-soft sand-...ne for subbase material. Though it ...n be dug and loaded to the Chevrolet ...ck easily by this Lima shovel, it had ...be broken up on the road before ...l compaction could be attained.

On the Smith Brothers spread, a Cat No. 12 motor grader turns over a windrow of sandrock to expose the larger pieces. They are crushed by the heavy roller pulled by the Cat DW10 tractor.

zles. These nozzles, made by Municipal Supply Co., South Bend, Ind., sprayed the water over a large area so that the material could be properly blended and brought to optimum moisture content. When this had been achieved, the 7-inch course was laid down and compacted in one lift.

Compaction of this deep lift was done largely by a pair of single-drum shop-made steel rollers. One of these was 7 feet in diameter and 6 feet wide, and was ballasted to weigh 15 tons. The other, ballasted to 20 tons, was 5 feet in diameter and 7 feet wide. Both rollers were pulled by International W9 and Caterpillar DW-10 tractors.

A Bros 9-wheel self-propelled roller worked with the motor graders as the material was being laid out, and it continued rolling along with the big steel rollers to help densify the surface. Broce also used a Ferguson 25-ton self-propelled rubber-tire roller on the base compaction. The completed base was test-rolled with the Grace 50-ton rubber-tire roller pulled by a Caterpillar DW10 tractor.

The finished base was primed with MC-1 cutback asphalt at a rate of 0.4 gallon per square yard. This prime was allowed to penetrate and cure out thoroughly before the 3 inches of asphaltic-concrete binder and 2 inches of asphaltic-concrete surface course were placed.

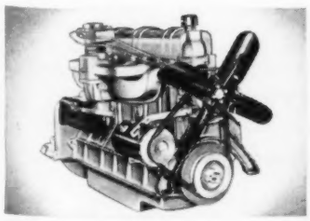
Sandstone subbase

A different kind of subbase operation was done on a 5-mile section near Adair by Smith Brothers Construction Co., Noble, Okla. Here, the most suitable native material was a semi-soft sandstone that occurred in relatively shallow strata with little or no overburden. The material did not have to be blasted and was easily handled by a power shovel, but it sometimes came up in fairly large pieces that had to be broken down for proper compaction.

At the pit, which was within 1½ miles of the turnpike, a Lima Model 44 1-yard shovel and a Unit Model 617 shovel with a ⅝-yard dipper loaded a fleet of 14 dump trucks. This setup produced the select material at an average rate of 2,600 cubic yards per 10-hour day.

The material, chunks and all, was hauled directly to the road and dumped on the subgrade. While a Caterpillar No. 12 motor grader turned the material over, a heavy shop-made roller broke up the chunks. This roller was made from four large steel wheels, taken from old steam tractors, that had been

This is the popular light-duty Model S-120 (4x4) INTERNATIONAL Truck. Features full-size, 3-man-wide cab and a choice of 12 different full-size, factory-built bodies, including the widest 6½ ft. pickup in the industry. Powered by 131 hp., short stroke, 6-cylinder engine, gasoline or LPG fuel. Available with factory-installed 8,000 or 15,000 lbs. capacity front-mounted winch, snowplow and other specialized equipment.



7 Dependable, economical power with sixteen 6-cylinder engines, up to 212 hp. Heat-treated, forged steel crankshafts and big bearing areas for a longer, more useful life. Precision machined, quiet, long lasting timing gears, too.

8 Save time and money. Get the truck that matches your job *exactly*. No need to compromise with the great span of 12 factory-built INTERNATIONAL 4x4 and 6x6 models, 7,000 to 43,000 lbs. GVW. Choice of job-matched components.

9 World's most complete line. There is an INTERNATIONAL "tailor-made" for every truck job, ½ tonners to 90,000 pounders. Choice of 4-wheel, 6-wheel and all-wheel-drive models, conventional and COE design. Every one built to cost *least* to own.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 252

welded together to form a single roller, then filled with concrete.

As a Caterpillar DW10 tractor pulled the heavy roller along, the combination of the cutting effect of the grousers on the wheels and the very heavy weight crushed the sandstone chunks and consolidated the material. When the big chunks had been broken down enough, the 6-inch course of material was watered, shaped by the motor graders, and compacted by four Grace 9-wheel rollers pulled in tandem by Minneapolis-Moline and Farmall tractors. Final test rolling was done by a Grace 50-ton rubber-tire roller pulled by a Caterpillar DW10 tractor.

A second lift of this same material was laid to make up the 12 inches of subbase, and a 7-inch lift of base material was placed over the subbase to permit bituminous paving to start.

Personnel

The superintendents of the Broce Construction Co. spread were J. R. Adams and E. E. Giggy. The Smith Brothers' spread was under the supervision of Glen Jordan. The consulting engineering firm on the Oklahoma Northeastern Turnpike is De Leuw, Cather & Co., Chicago, which is represented on the project by resident engineer E. E. LeFan. The chief engineer and manager of the Oklahoma Turnpike Authority is W. D. Hoback, who is represented on the project by construction engineer F. E. Hathaway.

THE END

Wall surfacing material low in cost, attractive

■ A new low-cost wall surfacing material that is said to be permanent, attractive, resistant to water and stains, and washable is announced by Vitricon, Inc. Vitricon is a cold-glazed concrete finish which may be applied to the wall on the building site or factory-applied to concrete panels and blocks.

According to the company, the new finish produces a depth of color and a three-dimensional effect not attainable with ceramic glaze. Its color range is virtually limitless; the colors may be used in combinations of two and three. Most colors are suitable for both interior and exterior surfaces.

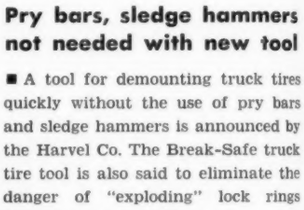
The odorless concrete finish is applied with low-pressure equipment. Sufficient hardness for normal usage develops within a few hours. Ultimate strength and hardness is achieved in less than 28 days. The material is incombustible. An abrasion test resulted in loss of surface glaze, but no loss of color or pattern.

For further information write to Vitricon, Inc., 26-02 First St., Long Island City 2, N. Y., or use the Request Card at page 18. Circle No. 27.

Pry bars, sledge hammers not needed with new tool

■ A tool for demounting truck tires quickly without the use of pry bars and sledge hammers is announced by the Harvel Co. The Break-Safe truck tire tool is also said to eliminate the danger of "exploding" lock rings when the tire is inflated.

The tool consists of a metal conical-shaped base on which the truck wheel and tire is mounted, a "spider"



Pry bars and sledge hammers are not needed to demount truck tires with the new Break-Safe truck tire tool.

arrangement of four cross bars with a lever and lead screw that is screwed into the top of the base by hand, and a set of four pressure pads which are hand-positioned over the tire bead, wheel rim, or lock ring, depending on the type of wheel.

By turning the lever, pressure is exerted evenly on the bead or rim. The same procedure is followed on both sides of the tire. According to the manufacturer, rusted rims or rubber adhering to the metal do not hamper the demounting operation.

For further information write to the Harvel Co., 5125 Coffman-Pico Road, Pico, Calif., or use the Request Card at page 18. Circle No. 26.

Hobbs opens new branch

A Lubbock, Texas branch has been opened by Hobbs Trailers, Fort Worth, Texas. The branch will expand Hobbs truck-trailer sales and service facilities in the Southwest. Wayne Sullivan is manager of the new Lubbock branch.

LOW HAULING COSTS COME RIGHT FROM THE "HEART" OF A '57 CHEVY

Many of the things that make a Chevrolet truck more economical to run are seldom seen by the owner. They're hidden features, deep in the truck's design. Here are just a few of them, to prove a Chevy's engineered better and built better for bigger savings!

1. *Forged steel crankshaft*—It's extra sturdy, precision machined and balanced, the foundation for dependable, long-lasting power!

2. *Aldipped exhaust valves**—Special aluminum treatment on valve surface protects valves against pitting; engine wears less, costs you less to run!

3. *Hydraulic valve lifters*—for longer valve life in V8's, fewer engine repair jobs.

4. *Chevy V8 piston*—Thanks to *short-stroke* V8 engine design, this piston travels a shorter distance, wears less. Short-stroke efficiency aids fuel economy, too!

5. *Oil-bath air cleaner—standard* on all Chevrolet truck engines for added protection against dust and foreign matter that shorten engine life.

6. *High-capacity oil filters***—They remove dirt particles from Chevy engine oil to cut engine wear and maintenance.

7. *Easy-adjust distributor points*—You can adjust this new Chevy V8 distributor *with the engine running*; it's added insurance against costly down time.

8. *Multiple fuel filters*—For *clean* fuel, all Chevy engines have fuel filters in the carburetor and fuel tank; in addition, V8's provide an *extra* filter at the carburetor.

9. *Ball-Gear steering mechanism*—Inside this steering gear scores of polished steel balls virtually eliminate friction. Less friction means less wear, less maintenance!

10. *Rugged manual transmission*—Synchro-Mesh design eliminates the need for double-clutching, reduces costly wear. Gears are shot-peened for extra strength.

11. *12-volt battery*—provides sure starting, good ignition, long battery life in all Chevrolet trucks.

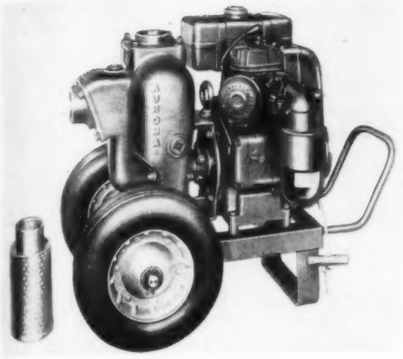
And there are many more! See your Chevrolet dealer for all the dollar-saving facts. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**On Thriftmaster 6, Trademaster V8.*
***Standard on V8's and Jobmaster, optional on Thriftmaster 6.*

1957 CHEVROLET TASK·FORCE TRUCKS

PROVED ON THE ALCAN HIGHWAY . . . CHAMPS OF EVERY WEIGHT CLASS! CHEVROLET

For more facts, use Reader-Reply Card opposite page 18 and circle No. 283



The new Series M contractor pumps announced by the Aurora Pump Division of the New York Air Brake Co. feature quick priming and high head output.

New quick-priming pumps have high head outputs

■ A new series of portable self-priming engine-driven contractor pumps is announced by the Aurora Pump Division of the New York Air Brake Co. Designated the Series M, five pumps are recommended for general purpose drainage applications.

The pumps feature quick priming and high head output. The maximum capacity of the smallest model is 105 gpm; the largest delivers 351 gpm. Inlet and outlet connections range from 1½ to 3 inches.

On all models the pump and gasoline engine are mounted on a common base. The units can be operated remotely from an electric power source. The two smaller models are equipped with carrying handles or spring-mounted pull skids. The remaining three models are available with carrying frames, or steel-wheel or rubber-tire carriages.

For further information write to the Aurora Pump Division, New York Air Brake Co., Aurora, Ill., or use the Request Card at page 18. Circle No. 52.

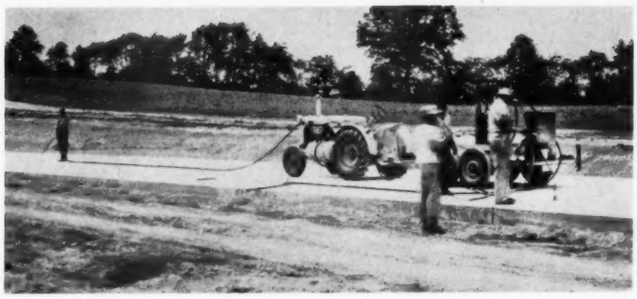
Sewer Construction

■ "Good Practice In Sewer Construction" is the latest of a series of technical bulletins available from the Clay Sewer Pipe Association. The bulletin gives complete data on the proper techniques for preparing the trench and the trench bed, finishing, backfilling, and inspection. Drawings and photographs illustrate the text.

To obtain this bulletin write to the Clay Sewer Pipe Association, 311 High-Long Building, 5 E. Long St., Columbus 15, Ohio, or use the Request Card at page 18. Circle No. 61.

help your heart fund

help your heart



DRAWING AIR from the same Le Roi 125 Tractair, one man cleans expansion joints while another fills the joints with sealer on this Ohio highway job. In the cleaning operation, a special nozzle is used at the end of a 50-foot length of hose. The sealer is carried on a small flat-bed trailer towed by the Tractair. The tractor has a 42-hp engine and a 125-cfm compressor. For more details write to the **Le Roi Division, Westinghouse Air Brake Co.**, 3716 W. Wisconsin Ave., Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 30.

Plan your tractor work around the FOUR DIMENSIONS of tractor earthmoving

To get your share of future business, and profits, you need *power* . . . not only to "bull" out the heavy loads, but to move the largest loads possible, at the highest possible speeds.

You need *traction* . . . to take advantage of the available power. Traction to work on steep grades . . . traction to hang-on in slippery footing and loose materials to keep heavy loads moving.

You need *speed* . . . to keep pace with today's demand for faster job-completion . . . speed to move more dirt on longer hauls . . . speed for quick returns.

And, for today's larger and larger jobs, you need *mobility* . . . to handle scattered assignments in less time . . . to meet emergencies of job or weather . . . to step-up production on sections behind schedule . . . to move fast job-to-job, without need for special hauling equipment and extra men.

In order to fully capitalize on tomorrow's opportunities, your tractor fleet of today must qualify in all FOUR of today's tractor dimensions . . . power . . . traction . . . speed . . . and mobility. Your present heavy-duty track-type tractors have adequate power and traction. But most lack speed in their working ranges . . . none meet your important needs in the fourth dimension — mobility.

Tournatractor leads the comparative crawlers in power, and matches crawler pull in higher gears (over 2 mph), but has less traction for pull in lowest gear (under 2 mph). It matches crawler speed and traction in the work range, saves time and momentum with instant gear changes, has twice the travel speed, along with full mobility to move cross-country or via highway to the next work assignment. To make maximum profits in the expanding opportunities ahead, you NEED both the low-speed traction advantage of the crawler and the high-speed mobility of today's improved Tournatractor!

May we arrange a demonstration for you? Call or write today . . . no obligation.

▼ Figure percentage of your cycles where low-speed pull advantage is important. Then figure percentage where speed and mobility make money. On many of your operations you'll find, even in heavy digging, that a lighter loading cut combined with high-speed haul, return, and moving between assignments, pays off in production and profit. Time-study your tractors and see for yourself, but be sure to measure loading your blade or bowl in TIME, not distance!

Study these tables showing relationship of pull to speed:

	SPEEDS	
Machine*	**Forward**	**Reverse**
Tournatractor	17.4 mph	7.3 mph
Cat D8	7.4 mph	7.4 mph
IH TD24	7.6 mph	6.6 mph
AC HD21	7.5 mph	5.5 mph

	POUNDS-PULL			
Machine*	**1.5 mph**	**2.0 mph**	**2.5 mph**	**3.0 mph**
Tournatractor	24,700	23,500	18,800	15,650
Cat D8	30,000	24,000	18,000	15,000
IH TD24	32,500	22,500	18,000	15,000
AC HD21	Pounds-pull curve not shown in manufacturer's literature available to us.			

Note: Figures taken from manufacturers' specification sheets available to us at time of printing.
*All machines torque converter equipped. Tournatractor—Trademark Reg. U.S. Pat. Off. CT-1149-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Where Quality is a Habit

Behind Noxon Rapids Dam, Cat D8's double up to push-load DW20's excavating gravel in the 1,300,000-yard cut. About two thirds of this excavation is wet clay, and the bulk of it has to be handled by dragline.

Contractor battles wet clay to relocate railroad behind dam

As the 190-foot-high Noxon Rapids Dam rises on the Clark Fork River in northern Montana, contractors are preparing for the 380,000 acre-feet of water that will back up 38 miles when the Washington Power Co's. hydroelectric project is completed.

One of the busiest of these contractors is Guy F. Atkinson Co., South San Francisco, Calif., which holds a $2,500,000 contract for the relocation of almost 21 miles of roadbed for the Northern Pacific Railway. Impounded water will cover up the present roadbed along the western side of the river, and a new roadbed is being put down that will keep the tracks above the level of the impounded water. This route, which crosses the river about ten miles above the dam, follows the eastern shore and recrosses the river below the dam. Thus the amount of blasting through rock is reduced.

Clay holds water

The big problem on this job is handling the large amount of wet clay that has to be cut back on 4 to 1 slopes. Berms frequently have to be built to keep the material from slipping. The clay, which readily absorbs and holds moisture, contains from 25 to 50 per cent moisture, by test. The characteristics of the material made it necessary for Atkinson to move four instead of three million yards as originally estimated.

Plenty of pit-run gravel is available along the job for the roadbed, which will be 25 feet wide across fills, 30 feet wide in backwater sections, and at least 44 feet wide in cuts, depending on the depth of the cut. Excavated clay is wasted on the downhill slopes.

Rock also excavated

On the upstream or southern end of the project, where a new steel bridge will replace an old steel trestle across Beaver Creek, Atkinson is using six Cat DW20's and scrapers and four Cat D8 tractors to move 900,000 yards of material.

Across the river, two D8's with two Cat No. 463 scrapers and two No. 12 motor graders are pushing the roadbed through 25,000 yards of clay.

More than 12,000 yards of rock are also being moved in this part of the job. This rock is shallow and is being

Models from 40 to 400 h.p., gas or diesel. Series 0-4 illustrated, 40-50 h.p.

Harbormaster . . .

work horse of the waterways

If you need easily installed power, better steering control, safety in shallow water, easier maintenance, more efficient performance, simpler hull design, more cargo space, bigger payloads, or simplified crew operation . . . you should investigate the benefits of Harbormaster Outboard Propulsion and Steering. Harbormaster is a complete power and steering package. It is powerful and highly maneuverable and has wide application in shallow or deep water, for coastwise service as well as in harbors, lakes, canals, and rivers.

Send for catalog giving complete information and showing Harbormasters in action . . . or if you have a problem our marine architect will make recommendations without obligation.

MURRAY & TREGURTHA, Inc.
44 Hancock St., Quincy 71, Massachusetts

For more facts, circle No. 285

MULLER MACHINES *cut* Contractors' Costs

PLASTER AND MORTAR MIXERS — 5 sizes 2 to 10 Cu. Ft. Electric or Gasoline. Power throw-out on smaller models, disc clutch on larger.

NEW 3½ CU. FT. NON-TILTING CONCRETE MIXER—Drum 36" dia. x 27" wide. Discharge opening 14". B & S Air-Cooled Engine 7.7 Hp. at 2700 RPM.

MULLER MIXER

CONCRETE MIXERS TILTING TYPE—3, 3½ and 6 Cu. Ft. Electric or Gasoline. Timken Bearings.

Muller Machines lead in low prices and low operating and maintenance costs. These result from the use of the best materials and components, simplified design and efficient manufacturing methods, based on 50 years of specialized experience.

4 BLADED POWER TROWELS—24", 29", 34", 44" dia. B & S Air-Cooled Engines. Clutch and speed controls on handle.

Ask for prices and name of local dealer.
MULLER MACHINERY COMPANY, INC.
Metuchen 15, N. J. Cable Address: MULMIX

For more facts, circle No. 286

For Efficient Consolidation Soil Testing You Need..

an **OLSEN** KW Conbel

- Infinite choice of loads up to 10 tons per square foot on 2½" dia. sample
- Floating bellows—eliminates eccentric loading
- Instantaneous load application
- Compact—less than 1½ sq. ft. of table space
- Simplified controls—one man operation
- Light weight—portable

For information about the Conbel and other soil testing equipment in the Olsen line, write for Bulletin 50.

TINIUS OLSEN TESTING MACHINE CO.
2130 Easton Road Willow Grove, Pa.

For more facts, circle No. 287

NEW LUG-ALL® WINCH HOIST

FEATHERLIGHT

Pulls, Lifts, Lowers, Stretches, Bends, Moves, Straightens, Tightens AT ANY ANGLE!

Up to 2 TON CAPACITIES

Ideal for maintenance and construction work—three hooks and built-in pulley block permit working in "tight" places—inter-locking pawls give positive control—reversible safety handle bends when severely overloaded—open construction allows easy removal of dirt, sand or ice—simplified maintenance (only five pins and three snap rings lock the LUG-ALL together) eliminates need for factory servicing.

Prices start at **$36.75** FOB FACTORY

QUALITY CONSTRUCTION

STRUCTURAL TYPE PROTECTIVE FRAME • HIGH STRENGTH FLEXIBLE AIRCRAFT CABLE • STAINLESS STEEL SPRINGS • OILED-FOR-LIFE BEARINGS

Special salt-spray tested "Marine" type models available for work in mines and where serious rust and corrosion problems exist.

LUG-ALL SPECIFICATIONS

Model No.	DOUBLE CABLE Capacity	DOUBLE CABLE Lifting Distance	SINGLE CABLE Capacity	SINGLE CABLE Lifting Distance	Weight	Price
4000-20	4000	10 Feet	2000	20 Feet	15 lbs.	$53.50
3000-30	3000	15 "	1500	30 "	13¾ "	53.70
3000-10	3000	5 "	1500	10 "	9 "	37.80
2250-38	2250	19 "	1125	38 "	13½ "	53.30
2250-15	2250	7½ "	1125	15 "	8¾ "	36.75
1500-25	1500	12½ "	750	25 "	8½ "	40.00

Write today for 4-page folder which fully describes complete LUG-ALL line

THE LUG-ALL COMPANY, Haverford 2, Pa.

For more facts, circle No. 288

A large drainage ditch to intercept ground water is cut in the wet clay on the uphill side of the railroad bed by a Bucyrus-Erie 54-B dragline.

Drainage ditches are cut on an almost completed section by a Cat No. 12 motor grader and a D8 pulling a No. 463 scraper. Backwater, which will rise to within 31 feet of the tracks at this point, will cover most of the lowland at right.

drilled below grade by six Gardner-Denver Air Trac drills with 2¾ and 3-inch carbide-tip drills. Each pound of Columbia 40 per cent explosive yields about a yard of blasted shale. Blasted clay and rock are loaded into three Euclid TDA dump trucks by a Bucyrus-Erie 54B dragline; the rock is being hauled two miles to the river bridge, while the clay is being wasted beside the roadbed.

Moving across a long, flat stretch, three D8's and five Cat DW20's and scrapers stripped 3 feet of clay to get to a gravel bed that provided material for building up the roadbed. A No. 12 motor grader worked with this team as the wet clay was removed 4 feet below grade and replaced with gravel. Where clay is retained, Atkinson must get 95 per cent compaction, done by equipment routed over fills.

Largest cut

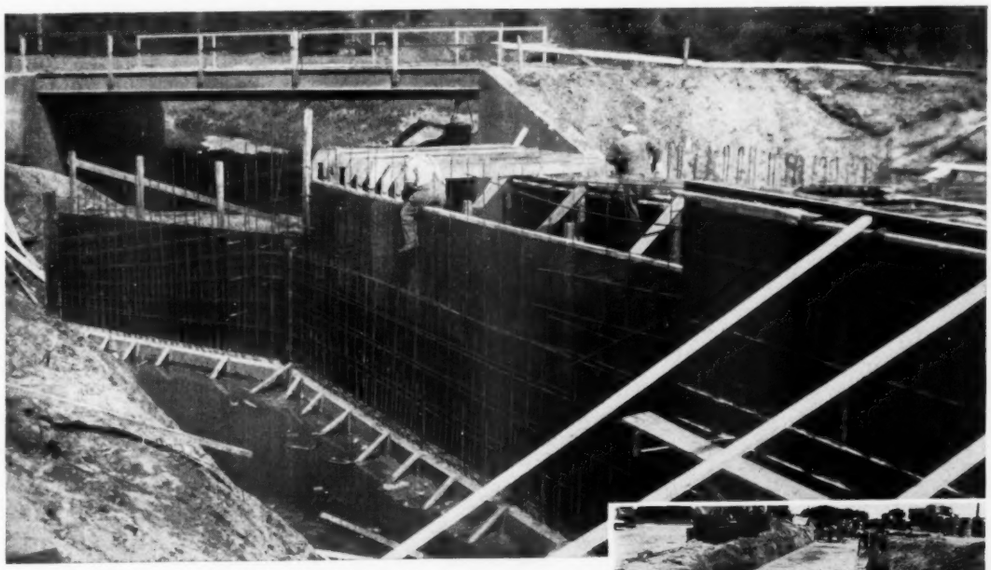
The biggest cut on this job—involving 1,300,000 yards—was opened by six DW20's, which were push-loaded in tandem by six D8's, while a No. 12 motor grader maintained the haul roads to the waste area 800 feet away. The scrapers removed the gravel, comprising about one-fourth of the cut, and about one-fourth of the clay. But because of the heavy rains and the characteristics of the water-retaining material, the remaining clay was removed by four draglines—two of them Bucyrus-Erie 54-B's.

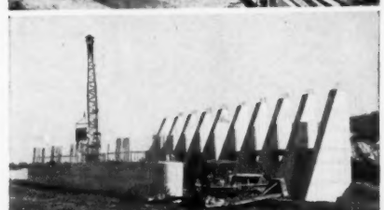
This cut was originally made on 1½ to 1 slopes, but since the clay would not hold, the 90-foot cut was opened to a 65-foot width at the grade. Side slopes are 1½ to 1 in the gravel and 4 to 1 in the clay, and a 12-foot berm has been cut back at a distance of at least every 22 feet to hold the clay from slipping.

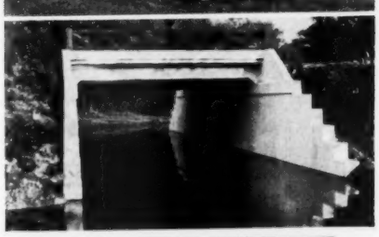
Near the Swamp Creek crossing, where another bridge is to be built, a dragline is working on most of the remaining 500,000 yards of rock. This blasted shale is loaded into two Euclid TDA trucks. One D8 is being used to clean up around the shovel that loads the material out, another D8 spreads the fill, and a Cat No. 12 motor grader maintains the haul roads.

In the vicinity of Rock Creek crossing, the poor-draining clay is also a problem. Here, a wide ditch was cut

(Concluded on next page)







forming Bridges, Culverts, Piers?

UNI-FORM PANELS

Save LABOR, MATERIAL, TIME!

Simple mechanical assembly and pre-engineered techniques for handling virtually any forming condition make UNI-FORM Panels your best bet for fast, low cost forming. Successful contractors everywhere are using the UNI-FORM system to form bridges, overpasses, culverts, piers and abutments, because their experience has shown that UNI-FORM Panels give them the speed, flexibility and economy required to handle this complex type of forming at the lowest possible cost.

Let us prove our point. Send a set of plans for detailed forming specifications, recommendations and cost analysis. There's no obligation, of course.

P1501

UNIVERSAL FORM CLAMP CO.

Concrete Form Specialists Since 1912

1238 North Kostner Avenue, Chicago 51, Illinois

BRANCH OFFICES AND WAREHOUSES

SAN LEANDRO, CAL. 2051-9 Williams Street
LOS ANGELES, CAL. 5855 S. Western Ave.
HOUSTON, TEX. 2314 Preston Ave.
CLEVELAND, OHIO 24901 Lakeland Blvd.
BALTIMORE MD. 1020 N. Kresson St.
ATLANTA, GEORGIA 1401 Howell Mill Rd., N.W.

For more facts, circle No. 289

Here Are The Basic Elements:

2. UNI-FORM Tie

3. UNI-FORM Tie Key

1. Steel framed, plywood faced UNI-FORM Panel

(Continued from preceding page)

along the uphill side of the grade to intercept ground water as the roadbed is built. Two D8's work in this area—one cleaning up and another spreading the fill—while a No. 12 motor grader maintains the roads.

Personnel

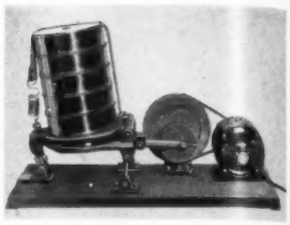
Atkinson is working two 9-hour, six-day shifts with about 200 men to keep the job moving along on schedule. This work, like construction on the Noxon Rapids dam and power plant and work on a highway relocation, is being directed and supervised by Ebasco Services, Inc., designer of the project, for the Washington Water Power Co. G. W. Wintz is project manager for Atkinson; Earl Walsh, general superintendent; Ernie Gressot, swing shift walker; Red Thompson, master mechanic; John Eilers, engineer; Oscar Mannon, rock excavation foreman; and C. H. Chamberlain, finishing foreman.

THE END

Machine sizes aggregates by rapid bumping action

■ A machine for checking aggregate sizes after the bitumen has been extracted from pavement materials is available from Bico, Inc. The Bico-Porter sieve shaker makes a screen analysis of the material and classifies it to AASHO standards.

The sieves, which are mounted on the machine so that they always tip forward, have a rapid backward-and-forward movement which produces two distinct bumps in every cycle. The lighter of these bumps plus the shaking action keeps the aggregate stirred up and throws it violently back and forth against the sieves, insuring the contact of all particles with the screen surfaces. The heavy bump serves to force the material through the screen.



Aggregates from bituminous pavements are accurately sized through a rapid bumping action by the Bico-Porter sieve shaker.

The motion of the aggregates is constantly cleaning the sieves, minimizing the possibility of clogging, according to the manufacturer. The sieves are rigidly held and the shock of the shaking action is evenly distributed for minimum wear on the sieves. Simple adjustments regulate the length of the throw and the intensity of the bump to adapt for sample size and characteristics of the materials used.

For futher information write to Bico, Inc., 3116 Valhalla Drive, Burbank, Calif., or use the Request Card at page 18. Circle No. 28.

Wire-rope slings

■ Wire-rope slings and assemblies are described in a 52-page catalog from the John A. Roebling's Sons Corp. The catalog is designed for quick and accurate sling selection and ordering. It has been organized around a simplified coding system for ease of identification.

Included in the catalog are sections on all-purpose slings with tapered sleeve attachments, Roegal cable-laid slings, Flatweave slings, railroad slings and special assemblies, and fittings. Each type of sling is pictured, and complete capacities and dimensions are included. A special section explains under what conditions the rated capacities apply.

To obtain Catalog A-931 write to the John A. Roebling's Sons Corp., 640 S. Broad St., Trenton 2, N. J., or use the Request Card at page 18. Circle No. 46.

Liquefied petroleum gas

■ The story of LPG—liquefied petroleum gas—and its applications to construction equipment is told in a booklet from the Marvel-Schebler Products Division of the Borg-Warner Corp. The booklet explains what the gas is, how it is produced, how much of it is available, how it can be used, and what its cost advantages are.

An LPG fuel system is pictured and discussed. The complete procedure for converting a vehicle to LPG is explained. How to adjust an LPG system and the proper methods of storing and handling the gas are also detailed.

To obtain "LPG Motor Fuel and You" write to the Marvel-Schebler Products Division, Borg-Warner Corp., Decatur, Ill., or use the Request Card at page 18. Circle No. 44.

←For more facts, circle No. 290

BID LOW *with help like this . . .*

MOST POWER PER YARD . . . most power per pound in its class

MOVES FULL LOADS AT FULL SPEED

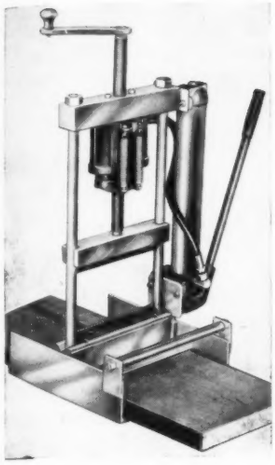
WIDE OVERLAP IN GEAR RANGES...for easy shifting, smooth acceleration

CURVED BOWL BOTTOM . . . offset cutting edge . . . for fast, full loading

HIGH APRON LIFT . . . positive, clean ejection

This is the Allis-Chalmers TS-360 . . . a motor scraper that has proved it can help you handle big, tough jobs on rubber . . . profitably. As bidding gets tougher, be ready with the best . . . TS-360's. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*



Hydraulic masonry cutter operates accurately, fast

■ A hydraulic masonry cutter that accurately slices stone, granite, marble, brick, cement blocks, and clay tile on a straight line without crumbling or tearing the material is available from the Tru-Split Tool Co. The machine is equipped with a 17½-ton Power-Twin hydraulic ram which is activated by a 10,000-psi pump mounted on the frame.

Two one-inch-square reversible alloy-steel blades mounted on edge do the cutting. The machine is adjustable to take any material up to 8½ × 10 inches in size.

According to the manufacturer, the hydraulic machine speeds masonry cutting by up to 75 per cent. The two-piece unit weighs 110 pounds.

For further information write to the Tru-Split Tool Co., 114 W. Seventh St., Winona, Minn., or use the Request Card at page 18. Circle No. 264.

Rehabilitating buildings

■ The inexpensive rehabilitation, both structurally and architecturally, of old brick or concrete structures is described in a four-page bulletin from the Gunite Contractors Association. The bulletin shows progress photographs and details step-by-step processes in the rehabilitation of a high school building.

To obtain "Rehabilitation With Gunite," write to the Gunite Contractors Association, 714 W. Olympic Blvd., Los Angeles 15, Calif., or use the Request Card at page 18. Circle No. 9.

Drafting room equipment

■ Equipment to expedite and improve drafting room operations is described in a brochure from Charles Bruning Co., Inc. Among the products detailed are console and desk-top reproduction machines, drafting tools, tracing mediums, drafting tables, and interlocking file systems. Also included is an electrically operated erasing machine.

To obtain this brochure write to Charles Bruning Co., Inc., 4700 Montrose Ave., Chicago 41, Ill., or use the Request Card at page 18. Circle No. 14.

For more facts, circle No. 291→

Asphalt plants, equipment

■ Asphalt plants and equipment made by The McCarter Iron Works, Inc., are described in a booklet from the manufacturer. The booklet covers the Model M-5000 semiportable batch-mix plant, the Models M-5000-S and M-6000-S stationary batch plants, a central outlet dryer, and auxiliary equipment.

Job application photos of the various plants illustrate the text. The center outlet dryer is shown by means of a line diagram. Among the accessories shown are a push-button air control panel, a bulk mineral filler handling system, a factory-mounted and wired electric panel, and a standard three-compartment 70-ton-capacity feed bin with control gates and apron feeder.

To obtain this booklet write to The McCarter Iron Works, Inc., Mill and Washington, Norristown, Pa., or use the Request Card at page 18. Circle No. 43.

Automatic-locking scaffold

■ Literature describing its Auto-Lock steel scaffold is available from the Superior Scaffold Co. The locking device is said to eliminate all play on guardrails, cross braces, and horizontal braces. The Auto-Lock snaps on and locks with a four-way grip. Lifting the head unlocks it. There are no small parts or wing nuts to lose. The head of the device is riveted on.

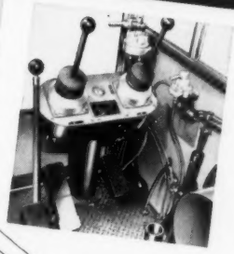
The literature pictures and describes all scaffolding components, including frames, brackets, half-height rungs, guardrail posts, clamps, braces, tubing, trusses, and casters.

To obtain Catalog 117 write to the Superior Scaffold Co., 5624 Bankfield Ave., Culver City, Calif., or use the Request Card at page 18. Circle No. 12.

New LORAIN-85A

brings 2½-yd. shovel users new performance-profits!

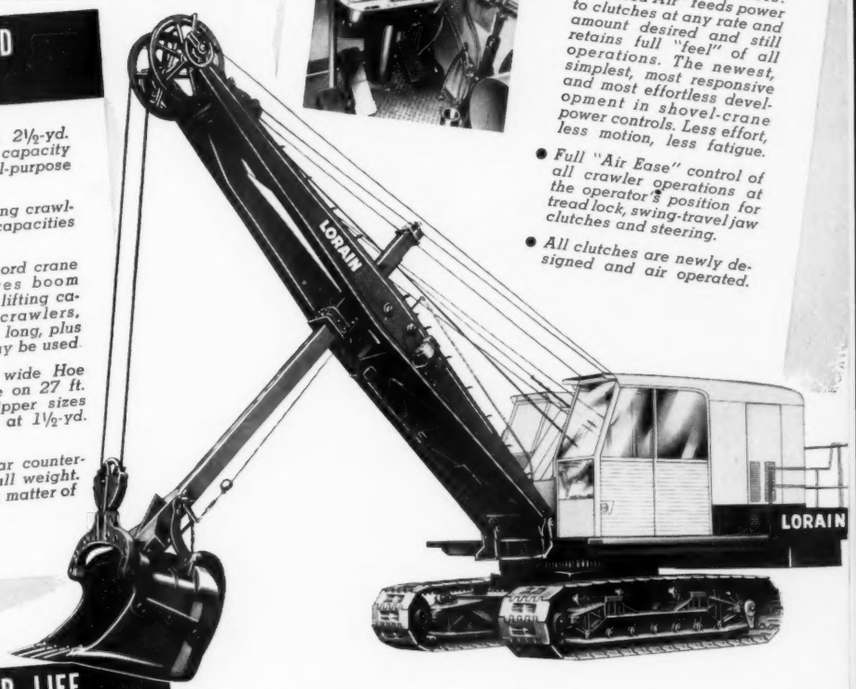
"JOY STICK" AIR CONTROL for easier operation



- Greater operating ease with 2-lever "Joy Stick-Air Ease" power controls. "Metered Air" feeds power to clutches at any rate and amount desired and still retains full "feel" of all operations. The newest, simplest, most responsive and most effortless development in shovel-crane power controls. Less effort, less motion, less fatigue.
- Full "Air Ease" control of all crawler operations at the operator's position for tread lock, swing-travel jaw clutches and steering.
- All clutches are newly designed and air operated.

FOR INCREASED CAPACITIES

- The Lorain-85A is a 2½-yd. shovel with 41 to 48-ton capacity as a crane on a general-purpose 2-speed crawler.
- An extra-wide, extra-long crawler provides for crane capacities of 50 to 60 tons.
- New square-tubular-chord crane boom design reduces boom weight and increases lifting capacities. On large crawlers, boom length to 200 ft. long, plus 40 ft. tip extension may be used.
- New 2½-yd., 62-in. wide Hoe bucket now available on 27 ft. boom. Other Hoe dipper sizes available beginning at 1½-yd. sizes.
- New, removable rear counterweight reduces overall weight. Can be removed in a matter of minutes.



FOR LONGER LIFE LESS SERVICE COST

- New Shear Ball mounting . . . the new idea in turntable mounting design. Turntable is secured to crawler and revolves easily and freely on a huge "ball bearing." No center pin or nut—no turntable rollers—with their adjustments, maintenance and lubrication.
- Torque converter power-take-off is available for the most efficient, smoothest method of taking full advantage of the abundant power supplied for turntable operations. "Never-say-die" power; adjusts automatically to digging needs; no shock; no stall.
- Generous use of anti-friction bearings throughout the new Lorain-85A. Used on hoist drums, swing drums and retract and crowd clutch drums. Crane boom head sheaves also on anti-friction bearings.

Nothing has been spared in the new Lorain-85A to put it far ahead of the field in the 2½-yd. shovel-crane class. Every improvement, every refinement—from the new look in the new cab to the hidden anti-friction bearings—has been incorporated to give owners the last word in performance and profits. Many design improvements that increase capacity and result in easier, smoother operation enable the "85A" to live a longer, trouble-free life.

Don't miss seeing it. Ask your Thew-Lorain Distributor for all the facts and figures. Make every comparison. Only then can you appreciate the Lorain-85A built-in values that will pay you profits for a long time to come!

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

manufacturer memos

Robert W. Galvin, the new executive vice president of Motorola, Inc.

Motorola promotions

Robert W. Galvin, formerly executive vice president of Motorola, Inc., Chicago, Ill., is the new president of the firm. He succeeded Paul V. Galvin, who has been elected chairman of the board.

A number of other promotions have also been made by the firm. Daniel E. Noble has been named executive vice president in charge of the redesignated Communications and Industrial Electronics Division, the Semi-Conductor Products Division and the Military Electronics Division. Arthur L. Reese was advanced to vice president and general manager of the new Communications and Industrial Electronics Division. Noble will continue to serve as vice president and general manager and Reese as vice president and operations manager of Motorola Communications and Electronics, Inc., the firm's wholly owned industrial sales subsidiary.

Other promotions include those of Roy Olson as manager of the Microwave and Industrial Control Products Department, Angus Macdonald as director of engineering, William Weisz as chief engineer of the Mobile and Portable Communications Products Engineering Department, Joseph Chambers as vice president of the Western Area Military Electronics Center, and Henry Magnuski as staff scientist to the executive vice president.

C.I.T. elects Lenihan

Thomas E. Lenihan has been elected president of C.I.T. Corp., the industrial financing subsidiary of C.I.T. Financial Corp. Lenihan succeeds Sydney D. Maddock, who had headed the company's industrial operations since 1932. Maddock assumes the position of chairman of the executive committee.

C.I.T.'s new president, Thomas E. Lenihan.

Lenihan, 44, joined C.I.T. in March, 1928, as an auditing clerk. He has spent his entire business life with the company, filling positions on the the Pacific Coast and with C.I.T.'s Canadian subsidiary, as well as in the New York headquarters. He was elected a vice president and director in 1953 and was previously an assistant vice president, assistant secretary and head of industrial credit operations.

C.I.T. Corp., one of the nation's largest industrial financing organizations, provides installment financing services for more than ninety industries, and will handle more than $300,000,000 in business in the current year.

Elastizell has new vice president

The new vice president of engineering and research and a director of the Elastizell Corp., Alpena, Mich., is Dr. Leo M. Legatski, professor of civil engineering at the University of Michigan. Legatski has had civil engineering experience as a structural designer, researcher, consultant, and teacher, He is a member of the American Society of Civil Engineers, International Association for Bridge and Structural Engineering and the American Concrete Institute.

Others elected to corporate offices are: Jesse H. Besser, president of Besser Company, who is chairman of the board; Raymond M. Douglas, president; Edwin H. Rosenthaler, executive vice president, and Marx P. Rosenthaler, treasurer. The secretary is George E. McMurray Jr. Lawrence J. Bernard is director.

Division manager named

The General Tire & Rubber Co., Akron, Ohio, has J. H. Boring as Pittsburgh division manager. As head of the newly formed division, Boring, former Richmond, Va., division manager, will direct sales of General products in part of New York, Pennsylvania, and Maryland.

Officer changes at Porter

T. M. Evans has been elected chairman, and Charles L. Holbert, president of H. K. Porter Co., Inc., New York, N. Y. Evans is the former president of the company. Holbert, before joining Porter last year, was executive vice president of the Southern Pacific Milling Co., Ventura, Calif.

When it comes to torque converter-equipped crawler tractors, few contractors can claim the experience of Edward J. Petrillo, president of Yonkers Contracting Company, Inc., Yonkers, N. Y. He's been advocating torque converter drives ever since Allis-Chalmers first introduced them for heavy-duty tractor use back in 1940.

There's good reason for Mr. Petrillo's use of torque converter drives. Says his Chief Purchasing Agent & Equipment Manager, Charles S. Campello: "Our Allis-Chalmers HD-21's, and their predecessor HD-20's and 19's, have never been down due to torque converter trouble—and we've used them on some of the biggest, toughest jobs in the East. All we ever do is give them normal field maintenance, which consists of checking the torque fluid level and conventional lubrication. Time required for this is insignificant."

Currently Mr. Petrillo has more than 50 A-C Crawler Tractors equipped with A-C torque converter drives. And, of course, A-C standardizes on Twin Disc Torque Converter components. But there's much more than just trouble-free operation behind his choice of torque converter drives. Production-wise, the torque converter automatically matches output torque to load conditions—with minimum or no gear-shifting . . . cushions out shocks and vibrations to reduce parts wear and breakage . . . and provides accurate load control.

Put a torque converter-equipped machine on your next job—particularly where operating conditions are really rough. See for yourself what Twin Disc Torque Converter drives can do for *you*!

Working with scrapers, these A-C HD-16's use torque converter drives (optional). Current HD-21's use torque converter drives as standard . . . but with either model the torque converter components are Twin Disc's.

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division), Rockford, Illinois

For more facts, use Reader-Reply Card opposite page 18 and circle No. 292

Daniel S. Heffron, newly elected vice president of the "Quick - Way" Truck Shovel Co.

Vice president elected

Daniel S. Heffron has been elected vice president of the "Quick-Way" Truck Shovel Co., Denver, Colo. Heffron, director of sales for Quick-Way since 1944, was formerly vice president of the Midland Refractories Co., Chicago, Ill.

Two new technical posts filled by R B & W

Duke A. Garrison and Frederick E. Graves have been appointed to new technical sales posts as assistants to the vice president in charge of engineering and research for the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Garrison, working from the company's Chicago office and Graves, working from the company's Port Chester, N. Y., headquarters, will work with John S. Davey, vice president in charge of research and engineering, to provide technical assistance to fastener users.

In charge of sales promotion and expansion of Wagner Tractor Co. is J. Burke Long.

Long takes position with Wagner Tractor

Wagner Tractor Co., Portland, Ore., has made J. Burke Long director and vice president in charge of sales promotion and expansion for the firm. Long was formerly president of Mixermobile Co. Long's first task is the establishment of a larger dealer system for the Wagner 4-wheel drive tractors.

Malcolm joins Hyster

N. I. Malcolm has joined Hyster Co., Portland, Oreg., as sales promotion representative at the firm's Danville, Ill., plant. In this newly established post, Malcolm will coordinate promotional programs in the Eastern Industrial Truck Division and will assist Hyster's Eastern Division dealers in formulating local promotional programs.

Southern district manager appointed by Cummer

J. E. DeLoache was appointed southern district manager for F. D. Cummer & Son Co., Cleveland, Ohio, last month. DeLoache is working from headquarters at 4265 Jackson Drive, Decatur, Ga., for the manufacturer of asphalt plants.

Sherman Products appoints assistant to president

A new position with Sherman Products, Inc., Royal Oak, Mich., that of assistant to the president, has been filled by John C. Scowcroft.

A former purchasing agent for Sherman, Scowcraft has been manager of product research for the past two years.

Worthington makes personnel changes

E. Weston Hammond was appointed district manager of the Los Angeles district office of Worthington Corp., Harrison, N. J., last month.

Formerly assistant manager of the office, Hammond replaces J. G. Murphy, who has been appointed special representative. Hammond joined Worthington in 1922 as a student engineer at the corporation's Buffalo Division. Murphy, who started with the firm in 1920 as an application engineer, was district office manager of the El Paso office before becoming manager of the Los Angeles office.

Howell Tractor appoints

The new president of Howell Tractor & Equipment Co., Chicago, Ill. is F. L. Regnery. C. T. Mitchell and D. W. Howell have been named vice president and general manager, and vice president and sales manager, respectively. V. F. Phillips is treasurer. Howell distributes construction equipment.

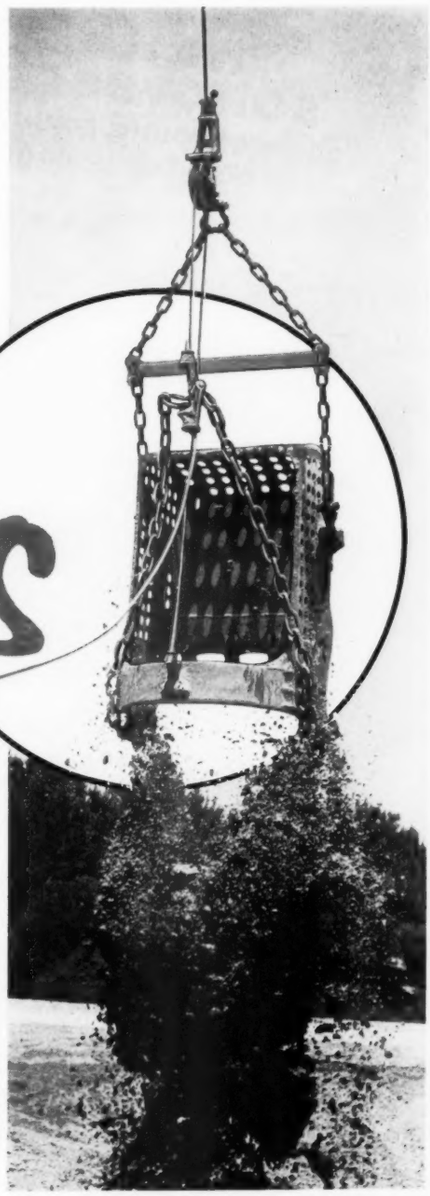
D. J. Redmond, the new Hercules Galion director of sales.

Name director of sales for Hercules Galion

Sales work of Hercules Galion Products, Inc., has been placed under D. J. Redmond, the new director of sales for the firm. He will be responsible for activities of the Hercules Steel Products Co., Galion Allsteel Body Co., Unisteel Body Co., and Hydro E-Z Pack Co. divisions. Redmond formerly served as assistant to Galion's senior vice president.

EMPTY BUCKETS CAN MEAN...

MORE PROFITS



HENDRIX

DRAGLINE BUCKETS

...DUMP CLEANER allowing a full load capacity on every digging cycle. A full bucket every cycle results in more material moved in less time for the lowest "cost-per-yard."

Hendrix Lightweight Dragline Buckets

A TYPE FOR EVERY DIGGING PURPOSE

¼ to 40 Cubic Yards

All Hendrix Buckets available without perforations

HENDRIX MANUFACTURING COMPANY, Inc.

MANSFIELD, LOUISIANA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 293

This king-size straddle carrier, weighing 20 tons and straddling an area 20 feet wide and 9 feet high, picks up piles for storage and loads them on barges. It rides on tires arranged in tandem on the drive wheels and as duals on the steering wheels.

Precasting and prestressing of conc

Pre-tensioned piles and deck sections are steam-cured, permitting straddle carrier to handle them within 24 hours

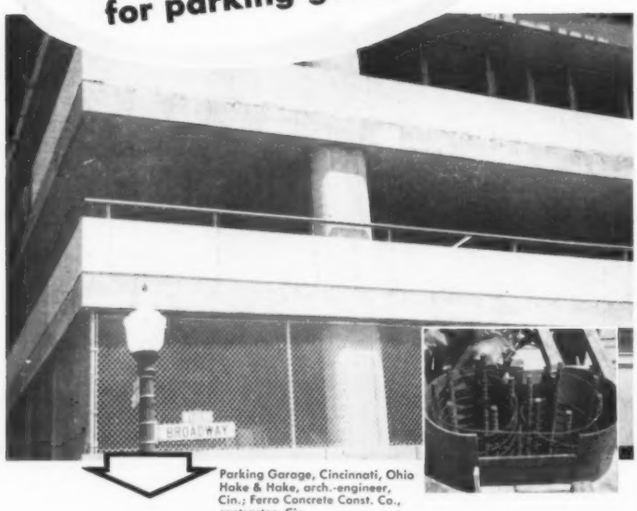
A new, prestressed concrete plant—featuring a steam-curing process that gives high early strength to concrete and a straddle carrier capable of handling 50-ton sections—got its initial workout producing trestle members for the Galveston-Pelican Island Causeway. (See page 26.)

Set up by Whittle Construction Co., Inc., Dallas, Texas, in the Houston suburb of Pasadena, the plant's initial job was to turn out 500 trestle piles, 528 deck girders, 168 railroad deck slabs, and 2,000 sheet piles. This was enough to warrant setting up the extensive plant. But now that prestressing is beginning to gain popularity in the Houston area, Whittle hopes to continue producing prestressed concrete structural sections of all kinds.

Since the plant has been set up next to the Horton & Horton Concrete Co., a ready supply of concrete will always be on hand. The plant, also adjacent to a slip connecting with the Houston ship channel, has ready access to both rail and water shipping facilities. The sections prestressed for the Pelican Island causeway were shipped by barge to the bridge site more than 40 miles away.

The 35-acre site, cleared of trees by an Allis-Chalmers HD-9 tractor fitted with a Baker dozer, has two parallel casting beds that form the

LOW-COST
SONOTUBES®
form obround columns
for parking garage!



Parking Garage, Cincinnati, Ohio
Hake & Hake, arch.-engineer, Cin.; Ferro Concrete Const. Co., contractor, Cin.

SONOTUBE®
FIBRE FORMS
for round columns of concrete

Forming obround, half round and quarter round columns with SONOTUBE Fibre Forms is economical and relatively simple. The inset photo, taken on the job during the construction of a parking garage in Cincinnati, Ohio, shows the form for an obround column using a template to hold the SONOTUBE halves in place.

Low-cost SONOTUBE Fibre Forms save time, money and labor! SONOTUBES provide a fast, economical method of forming round concrete columns to meet the design specifications of a wide variety of structures. Can be sawed on the job or ordered in required lengths. Available from 2" to 48" I.D. up to 48' long. Order Sonoco's patented "A-Coated" SONOTUBES for finished columns; wax-coated also available.

For complete technical data and prices, write

sonoco "SERVES THE WORLD" PAPER CARRIERS
REG U.S. PAT. OFF

SONOCO PRODUCTS COMPANY
CONSTRUCTION PRODUCTS DIVISION
HARTSVILLE, S. C.
LOS ANGELES, CAL. — 5955 SOUTH WESTERN AVE.
MONTCLAIR, N. J. — 14 SOUTH PARK STREET
AKRON, IND. • LONGVIEW, TEXAS • BRANTFORD, ONT. • MEXICO, D. F.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 294

AGGREGATES FOR KANSAS TURNPIKE
quarried with Brunner & Lay
ROK-BITS®

Carbide Rok-Bits—cross, chisel, "X", cut-away, taper socket bodies—standard, J-7.50; 200; 400; 600 types—gauge sizes: 1¾" thru 6".

Distributor: Martin Tractor Company, Topeka, Kansas.

Alloy or carbon drill steel—hex, round, extension steel, adapters, etc.

Aggregate production for the Kansas Turnpike called for a 1,500,000 ton one season run. Wagon drills equipped principally with Brunner & Lay Rok-Bits® put 3½" blast holes down through the 20-ft. limestone ledge. Rok-Bits gave increased drilling speed, greater footage life, fewer bit changes and lowest cost per foot of hole drilled which all added up to lowest cost per ton of aggregate. Jobs that call for top production, call for Brunner & Lay Rok-Bits. Put their cost-cutting features to work for you. Write for new catalog #756.

Brunner & Lay Products

Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. • Brunner & Lay Rock Bit of Philadelphia, Inc., 2514 East Cumberland St., Philadelphia 25, Pa. • Brunner & Lay of Los Angeles, Inc., 2425 East 37th St., Los Angeles 58, Calif. • Brunner & Lay, Inc., 150 Leslie St., Dallas, Texas • Brunner & Lay Rock Bit of Asheville, Inc., Sweeten Creek Rd., Asheville, N.C. • Brunner & Lay of Portland, Inc., 660 N. Tillamook St., Portland 12, Ore. Birmingham Rock Bit Co., Inc., 5-18th St., S.W., Birmingham, Ala.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 295

f concrete trestle members done swiftly at special plant

backbone of the plant. The beds are 425 feet long and are spaced 25 feet apart, and at one end of each is a heavy anchorage for the cables. At the other end are a pair of Rodgers 300-ton hydraulic jacks that apply tension to the cables.

Cast long piles

The long trestle piles cast for the Pelican-Island Causeway were 24 inches square and ranged from 78 to 106 feet in length. Each pile contained a 10-inch Sonovoid down the center. The longitudinal reinforcing consisted of 30 strands of $\frac{3}{8}$-inch Roebling bridge cable, while a series of square ties surrounded the cables to reinforce against diagonal tension.

A bank of 30 spools of cable was set up at the anchor end of the casting bed to permit the 30 strands to be pulled into place simultaneously. An Austin-Western 99 motor grader with a special attachment on the end of the blade pulled the strands onto the casting bed. The strands were threaded through holes in the bulkheads at each end of the piles by hand.

When the cables had been pulled the full length of the bed, the Sonovoids were inserted into the bulkheads and the steel side forms for the piles were placed. The hydraulic

(*Continued on next page*)

PRIME-MOVER M30 FOR ENGINEERED CONSTRUCTION Hauls 2/3 yard or 1-1/2 tons. Unloads transit mixers fast. Spots concrete right where it's needed on plant, warehouse, pier and bridge construction. Hydraulic Torque Converter Drive frees the operator from shifting, clutching and wasted effort. Rugged, dependable. Bucket and flat bed interchangeable.

M30

PRIME-MOVER

M15A

FOR HIGH VOLUME, LOW COST PLACING OF CONCRETE AND OTHER BULK MATERIALS—USE PRIME-MOVER POWER!

PRIME-MOVER M15A FOR BUILDING CONSTRUCTION

The established method of placing materials on school, hospital, and commercial building projects. Places 12 to 17 cu. yds. of concrete per hour — *without* extensive preparation for its use. Runs on same type of ramps, hoists and runways as hand carts. Available with flatbed, or 10 cu. ft. bucket.

FOR COMPLETE DETAILS WRITE TO PRIME-MOVER CO., MUSCATINE, IOWA
Or use Reader-Reply Card opposite page 18 and circle No. 296

When Ordering Equipment Specify INDUSTRIAL CABS And You're Sure of a Perfect Fit

Canopy Type

Easily Installed
Easily Removed

Ready Made for Your Make and Model Tractor

CONTACT YOUR EQUIPMENT DISTRIBUTOR

Semi-Enclosed Fully detachable

INDUSTRIAL CAB COMPANY
36 Jefferson Avenue *Phone Pioneer 4-3959* *Salem, Mass.*

For more facts, use Reader-Reply Card opposite page 18 and circle No. 297

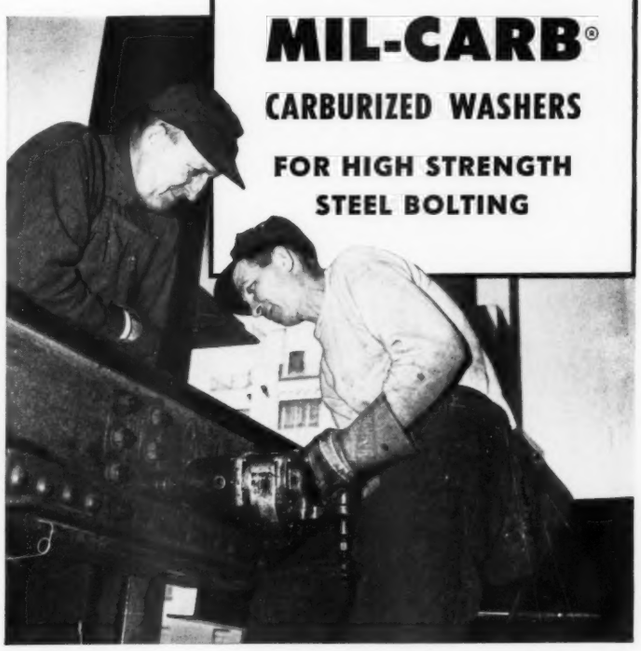
• *Photo courtesy Russell, Burdsall & Ward Bolt and Nut Co.*

WHY MORE AND MORE CONTRACTORS SPECIFY

MIL-CARB®

CARBURIZED WASHERS

FOR HIGH STRENGTH STEEL BOLTING



Contractors know a nut and bolt assembly is only as strong as its washers. That's why in high strength structural steel bolting, quality-conscious consulting engineers and contractors demand washers that match the best nut-and-bolt assemblies in . . .

1. **High tensile strength**
2. **Holding power**
3. **Uniformity**

On all three counts, Mil-Carb Carburized Washers fill the bill best—developed *specifically* by the world's largest producer of washers to meet the needs of modern structural steel jointing.

Mil-Carb Washers are fabricated from *prime* carburizing quality special soundness steel to insure strength to equal or exceed the rigid specifications of ASTM designation A-325.

Maximum holding power is assured by a closely supervised carburizing process which retains inner ductility of the metal, yet provides an exceptionally hard "outer skin". It's this tough "outer skin" which permits torquing nuts to specification maximums without danger of "galling" or grinding of the washer . . . imperative for permanent, uniformly strong, tight joints!

In addition, Mil-Carb Washers are uniformly flat and smooth with dimensions conforming to current requirements for heavy plain washers (carburized) of the American Standards Association (ASA Designation: B27.2).

For permanently strong, tight joints that become integral parts of the steel structure . . . *as permanent as the steel itself* . . . specify Mil-Carb Carburized Washers. Available in six sizes, from 5/8" to 1 3/8", packed in 200-lb. kegs.

Distributed by Leading Bolt and Nut Manufacturers and

U. S. STEEL SUPPLY DIVISION
UNITED STATES STEEL CORPORATION
208 South La Salle St. • Chicago 4, Illinois

WROUGHT WASHER MANUFACTURING CO.
The World's Largest Producer of Washers
2118 S. BAY ST., MILWAUKEE 7, WIS.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 298

Thirty spools of Roebling ⅜-inch bridge cable at one end of the casting yard are unwound simultaneously as cable is pulled into a pile form for longitudinal reinforcing. The casting bed is 425 feet long.

Strands of cable are fed through stirrups and holes in the bulkheads that separate the 24-inch-square piles. Two piles are cast side by side at one time for the Galveston-Pelican Island Causeway.

(*Continued from preceding page*)

jacks then applied the tension to the cables. The total tension for these piles was 360,000 pounds each. While the jacks maintained the tension, the concrete was poured into the forms.

The dry batches of concrete were proportioned in the nearby Horton & Horton Concrete Co. plant and discharged into three Challenge mixers mounted on International, GMC, and Ford trucks. The transit mixers drove up beside the casting beds and chuted the concrete directly into the forms to be vibrated carefully by a Mall mechanical vibrator. The bulkheads were arranged so that five piles were cast on each bed at one time.

Steam curing

As soon as the concrete had been placed, a Lorain 30-ton Moto-Crane began setting the protective covers over the casting beds. These tent-like covers, consisting of wooden frames covered with double tarpaulins, were built in 16-foot sections for convenient handling. When the covers were all in place, wet steam was released under them to accelerate curing.

Within four hours after the pour, the 125-hp oil-field-type boiler was discharging steam under the tarps. A temperature of 160 degrees was maintained for 16 hours, when the concrete tested from 4,200 to 4,500 psi. This was sufficiently strong to bond the prestressing cables and to enable the piles to be handled without being damaged.

After the covers had been removed and the tension released from the jacks, the prestressing cables between the piles were cut with a bolt cutter. Then the big straddle carrier went to work.

This wide-legged giant was built specially for this work. It can span an area 20 feet wide and 29 feet long and has a lifting capacity of 50 tons. The machine, which weighs 20 tons itself, is mounted on eight wheels. These tires have four-ply metal cores that prevent the tire from being punctured by nails or other sharp objects. The drive wheels of the rig are arranged in tandem, while the steering wheels at the other end are side-by-side duals.

Motive power is provided by a Chevrolet truck engine and transmission with chain drives to the wheels. The lifting power is provided

Barge Mounted Wiley Whirley cranes at work on the Harlem River on a 1300 lineal foot bulkhead job.

WILEY... for dependable ENGINEERING & WORKMANSHIP...

George W. Rogers, president of the George W. Rogers Construction Company, thinks very highly of the full revolving steam Wiley Whirleys shown above. He said they are ideal for his heavy construction work because "They are fast and hefty . . . and the maintenance is very nominal indeed."

Mr. Rogers said that the best indication of his feeling about these cranes is the fact that they have another one on order.

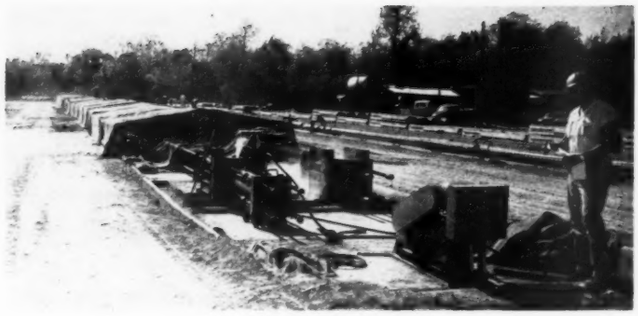
A SUBSIDIARY OF BARIUM STEEL CORPORATION

WILEY MANUFACTURING COMPANY
Port Deposit, Md.

• COAL BARGES • FLOATING CRANES • PILE DRIVERS • TUG BOATS

Write for free 38-page illustrated brochure, showing Wiley cranes, barges, tugs, etc., on the job.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 299



Rodgers 300-ton hydraulic jacks apply stress to the cables as the piles are cured by wet steam. The canvas covers, background, consist of double tarps attached to wood frames. The sections are in 16-foot lengths for ease of handling. Within 20 hours, concrete will have a strength of 4,500 psi.

Dravo Corp. elects Lloyd

F. J. Lloyd, Jr., has been elected a vice president of Dravo Corp., Pittsburgh, Pa. Lloyd, who is a director of Dravo, and general manager of its Keystone Division, has served the firm in various engineering, supervisory, and executive capacities. He holds executive positions in the Propeller Club, Port of Pittsburgh; the Pittsburgh Coal Exchange; and the Ready-Mixed Concrete Association of Metropolitan Pittsburgh.

by a Ford industrial engine. Both lift and steering are hydraulically operated.

For handling the long piles, a 65-foot length of 14-inch WF-176 beam was used as a spreader bar as the rig handled the long piles. A two-point pickup was used to handle the piles at the fifth points. The straddle rig simply drove in over the casting beds, picked up the piles one at a time and carried them to storage areas.

The same rig picked the piles up in the storage areas and carried them right onto the 26×110-foot barges making deliveries to the bridge site. Eight of the big piles—each weighing close to 25 tons—were loaded to a barge.

As soon as the piles had been removed from the casting beds, the concrete beds were coated with Texaco liquid wax, which was applied by hand. Then cable stringing began again, and the entire process was repeated.

Rich concrete mix

To obtain both the high early strength and the very high ultimate strength so desirable in this type of section, a 7-sack concrete mix with Plastiment admixture was used. Typical batch weights for a 1-cubic-yard batch were:

Cement	658 pounds
Coarse sand	896 pounds
Fine sand	163 pounds
Gravel (1½-inch maximum)	2083 pounds
Plastiment	21 ounces

Each of the girders for the roadway section of the trestle is 50 feet long and 3.8 feet high and has an I-shaped cross section.

The railroad slabs were essentially rectangular sections, 25 feet long, 10 feet wide, and 2.5 feet deep. Each of these sections had four 15-inch Sonovoids. The longitudinal steel for these sections was pre-tensioned.

The 2,000 sheet piles were among the first products turned out by the plant. They measure 15×30 inches in section and range from 15 to 27 feet long. They have conventional reinforcing which is not prestressed.

Supervising the plant activities for Whittle Construction Co. are superintendent Bill White, engineer Jim Ulner, and assistant superintendent E. T. Weathers. THE END

For more facts, circle No. 300→

Air Force Academy, Colorado Springs, Colo. T. F. Scholes, Reading, Pa., gen. contr., Long Const. Co., Kansas City, Denver and Detroit, sub-cont., Skidmore, Owings and Merrill, Architect.

37,000 sq. ft. Symons Steel-Ply Forms Used on Air Force Academy

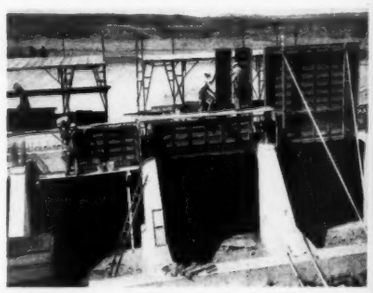
10,000 Lineal Feet of Retaining Wall Containing 24,000 Cubic Yards of Concrete

Symons Steel-ply Forms have earned their excellent reputation by serving effectively on a wide variety of forming jobs.

On the new Air Force Academy, for example, Long Construction Company, concrete contractor, is using 37,000 sq ft. of Symons Steel-Ply Forms. Long's low bid was based on rapid reuse of Symons Forms. The walls are battered and have counterforts on 14′ centers. They vary in height up to a maximum of 32′ and in widths from 12 inches at the top to 18 inches at the bottom. Total forming involved approximates 600,000 sq. ft.

Symons Service includes the details of any forming job from start to finish. Our engineers will prepare from your plans, a complete form layout and cost sheets—no charge or obligation.

Symons Forms may be rented with purchase option—rentals to apply on purchase price. For more information on Symons products and services send for our FREE catalog.



Symons Steel-Ply Forms being erected for the second lift. Note "work wagons" in the background.

Pouring first lift in Symons Steel-Ply Forms. An American Economobile is being used to pour the concrete.

Symons CLAMP AND MFG. CO.

4251 Diversey Avenue • Chicago 39, Illinois • Dept. B-7

OTHER OFFICES and WAREHOUSES

Pacific Coast Div.	North	South	East
683 Thornton St.	6404 Cambridge St.	509 Yorktown St.	John A. Crockett, Inc.
San Leandro, Calif.	St. Louis Pk. (Mpls.), Minn.	Dallas, Texas	King of Prussia (Phila.), Pa.

The primary crushing unit is a Pioneer No. 173 with a 36 x 42-inch jaw powered by a Caterpillar D13000 diesel engine. A belt conveyor takes the material to the intermediate screens.

The Pioneer intermediate unit at left—a 4 x 8-foot two-deck screening unit and a 15 x 36-inch jaw—and the Pioneer 137S secondary unit, with 4 x 10 double-deck screens and a 4022 roll crusher—bring material to the surge bin.

Crusher keeps tonnages high on base and hot-mix aggregate

Before the prime is applied, the base is rolled by a Tampo 13-wheel rubber-tire roller pulled by an International Model ID-9. A final rolling will be given the base by a steel-wheel machine.

Base turned out at rate of 2,600 tons per 10-hour day; composite double-drum dryer is used on asphalt plant

Setting a fast pace for other equipment, a Pioneer three-stage crushing and screening plant produced material for subbase and base course, together with aggregate for the bituminous surfacing material, for a 28-mile Arkansas highway job. This plant turned out subbase material as fast as a fleet of Euclid bottom-dumps could load from the storage bin. Base material with a maximum size of 1½ inches flowed from the plant at a rate of 2,600 tons per 10-hour day, and even the ¾-inch hot-mix aggregates were produced at a rate of 140 tons per hour.

This job on scenic U. S. 62 between Hardy and Salem in northeastern Arkansas, supervised by the Arkansas State Highway Commission, was a combination of two contracts for base and surfacing. The general contractor for the million-dollar paving job was McGeorge Contracting Co., Inc., Pine Bluff, Ark., which had also handled the grading for the new alignment of the highway.

The limestone rock for the subbase and base was obtained near the highway, at a quarry where the crushing plant was also set up. The 30-foot face of the quarry was drilled in two

BLUEJET CHAIN

"Our chain saws work hard on highway jobs and any construction where we have to clear trees and brush in a hurry. We've found the best way to keep them going—with BlueJet Chain. We use BlueJet because it stays sharp longer, stands up under all conditions. Less breakage, too, which means we save time. By saving time, BlueJet helps us save money."

GUIDE LINK— Reamed rivet holes give precision fit, eliminate stretch.

ROUTER— Precision ground, chrome plated high grade steel.

SIDE LINK— Ample "riding" area reduces bar wear and gives smoother cutting.

RIVET— Large head plus hardened bearing surface helps maintain chain tightness.

BlueJet Chain Co. AAA-1
2700 Fourth Avenue So., Seattle 4, Wash.
Please send me literature on BlueJet Chains.
Name _____
Address _____
City _____

Remember—There's a BlueJet Chain For Every Saw

For more facts, use coupon or circle No. 301

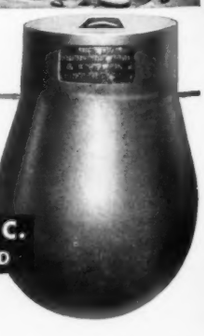
LOW COST POWER for WRECKING-SMASHING

FREDERICK CAST Semi-Steel DROP BALLS

Tough, rugged Frederick Drop Balls eliminate expensive drilling, blasting . . . deliver smashing low cost power when you want it, where you want it. Exclusive "Pear-shape" design drops straight—swings true—withstands greater impact. Balls 4000 lbs. or over are made of extra durable nickel alloy—or special alloys furnished on request. "E-Z" Swing recessed steel eye gives greater cable protection plus free swinging action. Balls can be furnished with replaceable pins. Use Frederick Cable Weights (135 & 250 lbs.) and Frederick Swivels on all size balls for true, safe cable performance. Special release hooks for free dropping also available.

Wide range of sizes and weights:

Pear shape (lbs.).....	1500	2000	3300	4000	5200	6500	8000
Ball shape (lbs.).....	500	1000	2000	5200			
Spherical shape (lbs.). (for magnet use)	470	950	1650	2400	3000	3700	5400



Write us today for prices and illustrated literature; order Balls direct or see your nearest Equipment Dealer.

FREDERICK IRON & STEEL, INC.
FREDERICK *Established 1890* MARYLAND

Phone: MOnument 3-5111

Makers of Manhole Frames, Covers and Steps • Storm Gratings Meter Frames and Covers • Centrifugal Pumps • Grey Iron Castings

For more facts, circle No. 302

The 7-inch base is moistened with water from a 3,500-gallon tanker pulled by a Ford truck. The top 4 or 5 inches will be scarified, windrowed, and mixed before the base is primed.

An Adams Model 610 motor grader mixes and lays out the 1½-inch-maximum material for the base. This machine will also help rework the surface before bituminous paving operation is started.

lifts by Ingersoll-Rand and Chicago Pneumatic wagon drills equipped with Timken bits and powered by an Ingersoll-Rand 600-cfm Gyro-Flo compressor. The 2¼-inch holes were spaced at 7×9 and 7×8-foot intervals in gridiron pattern.

The blast holes, using 1½ × 8-inch sticks, were loaded with American semi-gel No. 1 at a rate of about half a pound to a cubic yard of rock. The dynamite was detonated with 1, 2, and 3-millisecond delay caps arranged in sequence from the face back. A P&H Model 655A shovel with a 1½-yard dipper together with a ¾-yard Lima Paymaster shovel, loaded the broken rock into three end-dump Euclids that hauled to the crushing plant.

Three-stage crusher

Driving up an earth ramp and then backing out on a rock and timber crib, the "Eucs" dumped the rock to the apron feeder of the Pioneer No. 173 primary unit. The 36 × 42-inch primary jaw crusher was driven by a Caterpillar D13000 engine. A belt conveyor carried the crushed material to the intermediate unit, which consisted of a 4 × 8-foot double-deck screen and a 15 × 36-inch jaw crusher powered by a Caterpillar D-8800 engine.

In the intermediate unit, all material smaller than ½-inch was removed and carried by a separate conveyor to the last conveyor of the plant, which ran to the surge bin. This fraction of the material bypassed the secondary unit entirely. Material passing the 2-inch screen and retained on the ½-inch was carried over to the secondary unit. Oversize went through the intermediate crusher before going to the secondary screens.

The 4 × 10-foot double-deck screening plant of the secondary unit picked off the minus-¾-inch material and sent it directly via the final conveyor to the surge bins. Oversize was directed to the Pioneer 137S triple-roll crusher which was arranged in a closed circuit with the screen. The final conveyor of the plant deposited the finished material in a 25-cubic-yard elevated surge bin. The Euclid bottom-dumps that hauled to the road or to the stockpiles drove in under the bin and were loaded by gravity.

Cutback asphalt is applied the full width of the roadway in one application by a 23-foot spraybar on the 1,100-gallon Standard distributor. The pipe outrigger on the White truck guides the driver.

Each of the three units of the

ALL-HYDRAULIC!

SILENT HOIST KRANE KAR

HYDRAULIC
Boom Swinging
Boom Topping
Boom Telescoping
Load Hoisting

Originator and leader in its class for 30 years, KRANE KAR goes ALL-HYDRAULIC. Affords amazing ease of handling... touch control of all crane operations... with other engineering advances that simplify operator's work... eliminating gear shifting and clutch replacements... cutting maintenance to the bone and setting new standards of efficiency and productivity. Get the details. *Write, wire, telephone today.*

FLUID DRIVE
POWER STEERING

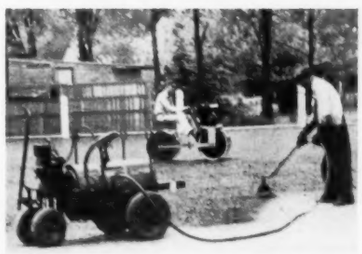
MODELS 1000 TO 25,000 LBS. CAP.

SILENT HOIST & CRANE CO.
Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
898 A 63rd ST., BROOKLYN 20, N.Y.

For more facts, circle No. 303

SPRAY IT RIGHT

Yes. "Right From your shipping drum"... with a TARCO SPRAYER



Materials Sprayed: Bituminous Binders... asphalt emulsions, light tars and cutbacks. **Weed Killers. Insecticides. Waterproofing materials** including silicone products. **Cleaning Solutions. Paints** ... oil and water base.

Fast and Convenient: You can change barrels in 5 minutes... **20 to 30 barrels daily.** Clean all lines in 3 minutes. You can plan your work and do it at your convenience with your own help... simple to operate. Easy to service.

Four Models: ... with a gasoline engine driven air compressor or gear pump. Wheel mounted or portable. Comes complete, ready to work with hoses, spray bar, nozzles.

Ideal for: Maintenance of all types of pavement. **Construction** of driveways, parking areas, walks, tennis courts, roadways. **Painting** buildings, bridges, guard rails, equipment. **Sub-sealing** work. **Curing concrete. Waterproofing** foundations and roofs.

TARRANT Manufacturing Company
31 Jumel St., Saratoga Springs, N. Y.

For more facts, circle No. 304

(Continued from preceding page)

While a load of hot-mix is dumped to the Barber-Greene finisher by the GMC truck, a Buffalo-Springfield roller consolidates the surfacing material. The hot-mix was laid as a 2-inch course in two 11-foot-wide passes.

plant was powered by its own Caterpillar diesel engine. In addition, a GM 100-kw diesel generator set provided electric power for the motors that ran the conveyors and other auxiliaries.

This crushing operation produced the minus-¾-inch material required for the bituminous mix. Some of the intermediate and secondary stages were bypassed to obtain greater production when the 1½-inch base material and the 3-inch crusher-run subbase were being turned out.

Base is compacted

The minus-3-inch subbase material was hauled to the road by nine Euclid bottom-dumps. Hauling at top speed, they could not take the material away as fast as it was produced. As the "Eucs" dumped the rock, it was spread by motor graders over a 38 to 40-foot width. The subbase ranged from 6 inches in depth near the center of the roadway to 3 inches at the edges to give the finished roadway a 3-inch crown.

On this subbase, three shallow lifts of base material were placed and compacted to provide a total of 7 inches of base. Both subbase and base courses were watered and rolled as they were placed. The road was then opened to limited traffic until the entire base operation had been completed and surfacing was about to start.

Prior to bituminous paving, the top 4 or 5 inches of the base were reworked and primed. Two 3,500-gallon water wagons, one pulled by a Caterpillar DW10 tractor and the other by a Ford F-8 truck, first thoroughly wet the section to be reworked. Water, obtained from the Spring River near the east end of the job, was pumped to the water wagons by a Gorman-Rupp 4-inch pump powered by a Wisconsin engine. As the material was moistened, Adams Model 610 and Caterpillar No. 12 motor graders scarified, windrowed, and mixed the top few inches of the base. When the material had been wet to optimum moisture content and was well mixed, the motor graders laid it out to proper shape and grade over the 36-foot width of roadway. This width provided for both shoulders and the base for the 22-foot bituminous pavement.

The surface was then re-rolled by two Tampo 13-wheel rubber-tire rollers towed by International 300 and ID-9 wheel tractors. A final rolling by the steel wheels of a Galion 5 to 8-ton tandem roller left the base ready for the prime.

Distributor makes one pass

In applying the prime, which consisted of 0.4 gallon of MC-O cutback asphalt per square yard, McGeorge used a distributor with an exceptionally long spraybar. A 23-foot spraybar on the Standard 1,100-gallon distributor mounted on a White truck enabled the rig to cover a 24-foot width in a single application. To guide the truck driver so that the spray would be applied to the proper part of the 36-foot base, a row of empty quart oil cans was set up at the proper offset from the centerline. A pipe outrigger, attached to the side of the truck, had a piece of chain hanging from the end to serve as a gage to keep the truck the proper distance from the row of cans.

The MC-O cutback asphalt, delivered by truck transports, was pumped directly into the distributor for application to the road. A small storage tank at the roadside stored any surplus between loads. When it was necessary to heat the cutback so that it could be handled, a Grace Rapid Fire car heater provided the necessary steam. The prime was allowed to cure two or three days before the

VULCAN

Super Service

PAVEMENT BREAKING TOOLS

QUALITY TOOLS GIVING BETTER SERVICE AT LESS COST WITH THESE ADVANTAGES:

Exceptional Durability — fully heat treated for maximum strength and freedom from premature breakage.

Unusual Strength — making use of the full power of modern hammers.

Unexcelled Performance — longer wearing, requiring less frequent resharpening.

Time-Tested — for over 25 years.

Liberally Guaranteed.

Specify **VULCAN** *for:*

PAVEMENT BREAKING TOOLS
CLAY DIGGING TOOLS
DRILL STEELS
PNEUMATIC HAMMER TOOLS
ELECTRIC HAMMER TOOLS
HAND TOOLS FOR CONCRETE, STONE, AND STEEL WORKERS

VULCAN

VULCAN TOOL MANUFACTURING COMPANY

41 LIBERTY STREET, QUINCY 69, MASSACHUSETTS

VULCAN TOOLS are sold by distributors throughout the United States and Canada.

Specialists in the Design and Production of Pneumatic Tool Accessories

For more facts, use Reader-Reply Card opposite page 18 and circle No. 305

The First Reference Book to Cover Every Aspect of

Excavating and Earthmoving

MOVING THE EARTH

By Herbert L. Nichols, Jr. a contractor of 20 years experience who is a recognized authority in this field

- detailed descriptions of the operations an excavating contractor must perform on literally hundreds of different jobs
- a wealth of information on the operation, maintenance, and repair of just about every machine used in excavating work.

1280 PAGES
•
2500 DRAWINGS
•
4000 TOPICS
Price $15.00

Published by North Castle Books Greenwich, Conn.

Fill in this coupon to order your copy

Book Order Dept.
CONTRACTORS AND ENGINEERS
470 Fourth Ave., New York 16, N. Y.

☐ Payment enclosed ☐ Bill me (plus postage)

Name .....
Address .....
City ..... State .....

For more facts, use coupon or circle No. 1

BUT—IT CAN BE MADE SMOOTH QUICKLY, EASILY AND INEXPENSIVELY with

Camp's Latex Concrete

REPAIR — TOPPING — WELDING

Revolutionizes cement and masonry repairs—ELIMINATES the CHIPPING or ROUGHENING, PRIMING and CURING that are necessary with ordinary cement patching materials. What's more, it is applied as THIN as 1/16", or whatever thickness needed. Rough, pitted, trowel-marked, uneven or broken concrete and masonry can be made smooth with a thin coat of

Latex Concrete —INDOORS and OUT—the answer to those "frozen" or "rain-pitted" concrete surfaces!

3 SIZES AVAILABLE. INCLUDE POWDER MIX AND LIQUID RUBBER LATEX:

SMALL KIT — 8 lbs. (sufficient to repair 50 to 150 ft. of average cracks) PRICE $2.95

LARGE KIT — 14 lbs. (double size) PRICE $4.95

CONTRACTORS UNIT—52 lb. drum Includes 40-lbs. powder mix, 1 gallon latex mixer. Sufficient to cover approx. 100 sq. ft., ⅜" thick. PRICE $10.00

PRICES ARE F.O.B. CHICAGO

The CAMP COMPANY, Inc. Dept. CE27 6958 South State Street Chicago 21, Illinois

OVER 21 YEARS OF CONTINUOUS SERVICE

For more facts, circle No. 306

bituminous surfacing was applied.

The mixing and placing of the hot-mix surfacing was subcontracted to Ben M. Hogan & Co., Little Rock, Ark., which set up a Simplicity Model S100 asphalt plant near the rock crusher. Natural sand and crushed rock aggregate for the two-aggregate mix were bucketed from stockpiles to the 40-ton bins of the plant by a Koehring 605 crane with a Blaw-Knox 1½-yard clamshell bucket. Simplicity chain feeders carried the materials to the cold elevator which raised them to the double-drum dryer.

The composite double-drum dryer was the most unusual feature of this plant. It consisted of two drums, one inside the other, arranged so the material flowed one way through the outer drum and then back through the inner one. The outer drum was 10 feet in diameter and 20 feet long, and the inner one measured 54 inches × 20 feet. One end of the composite drum was closed completely from the outside; the material entered and left the drum at the same end at which the burner was located.

The materials were raised from the dryer to a Nordberg 5 × 14-foot screen above the 4-compartment hot-storage bins by the hot elevator. Batches were weighed out manually to the 5,000-pound pugmill.

Asphalt cement was brought directly from the refinery to the plant by truck transports and stored in steam-heated storage tanks that had a total capacity of 36,000 gallons. The 60 to 70-penetration asphalt was pumped directly from storage to the weigh bucket and then to the mix.

The principal elements of the plant were powered by three Caterpillar D326 diesel engines. One was on the pugmill, one on the dryer, and one on the blower. Some of the auxiliary equipment was operated by electric motors that got their power from a Caterpillar D315 diesel generator set. With the 30-second mixing time and the relatively dry materials in this mix, the plant was able to turn out the surfacing mix at a rate of 150 tons per hour.

A fleet of from 10 to 30 rented trucks hauled 7½-ton loads of the mix to the road, where a new Barber-Greene finisher laid the surfacing at a rate of 200 pounds per square yard in a single lift. A Buffalo-Springfield 5 to 8-ton tandem roller and a Tampo 8 to 10-ton tandem rolled out the surface behind the finisher.

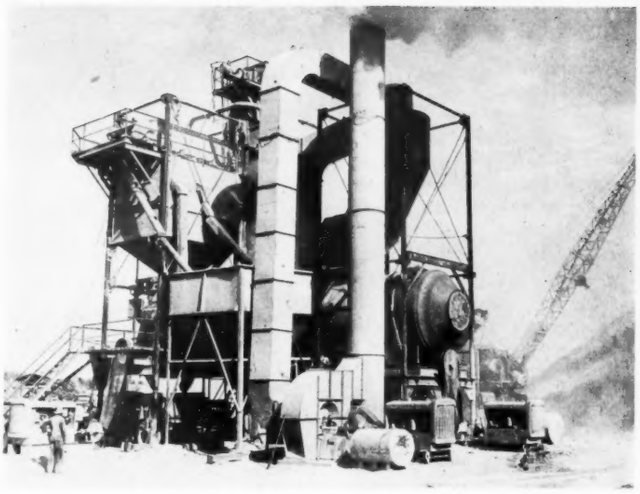
Plan quantities for the two contracts included the following:

Earthwork	548,705 cubic yards
Subbase	73,847 cubic yards
Base	168,823 cubic yards
Prime (MC-O)	157,724 gallons
Surfacing	37,771 tons
Contract price	$956,617.88

Personnel

The superintendent of the job for McGeorge Contracting Co. was W. P. Lincoln. The foreman of the crushing plant was L. G. Ramsey. The plant superintendent for Ben M. Hogan Co. was T. E. Brown, and the foreman of the work on the road was R. N. Guthrie.

This project was supervised by District 5 of the Arkansas State Highway Commission, with headquarters at Harrison. Two resident engineers represented the department on the project, one having supervision of each of the two contracts. They were C. M. Benz and Ray Murphy. The construction engineer for the department is E. E. Mashburn. The chief engineer is Ward Goodman and the director of highways for the state is Herbert Eldridge. THE END



Hot-mix materials are mixed in this Simplicity S100 plant, which has a double-drum dryer with a 10 x 20-foot outside drum and 54-inch x 20-foot inside drum. Materials flow through the outer drum first, then back through the inner drum.

CLEVELANDS dig 200 miles for water system in Gwinnett County, Ga.

Buchanan Pipe Line Company, Inc. of Birmingham, Ala. used 5 Cleveland trenchers to dig 200 miles of trench for a county-wide water system in Gwinnett County, Ga.—a multi-million dollar project requiring approximately 275 miles of pipe work. Digging 11" to 30" wide and 2½' to 4' deep in rolling terrain and in soil ranging from rock to sand clay, each of the 5 Clevelands averaged 3,000 feet of trench per day, working in wet weather.

Paul A. Buchanan, executive vice president of Buchanan Pipe Line Company, Inc., says this about Clevelands:

"We have bought 12 Clevelands since 1945, are now operating 6. Their performance has been entirely satisfactory, as evidenced by our repeat orders. In wheel-type machines we have standardized on Clevelands. We particularly like their simplicity of operation and maintenance and their good performance under adverse conditions."

Good Everywhere

THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

For more facts, use Reader-Reply Card opposite page 18 and circle No. 307

"It gives our team good practice and saves the county the price of a bulldozer."

This diesel-powered 250-cfm compressor is one of several new Jaeger machines.

Portable 250-cfm unit is gasoline or diesel-run

■ A 250-cfm rotary air compressor powered by either a gasoline or a diesel engine and mounted on a single pneumatic-tired axle is available from The Jaeger Machine Co. According to the company, full rated volume can be produced by the unit at 100 to 250 rpm below the normal 1,800 to 1,950 rpm of other rotary compressors.

The reduction in rpm is the result of a specially designed compressor unit. The reduction delivers air at cooler temperatures and decreases fuel consumption.

The same features are available in a smaller unit that delivers 125 cfm, and in larger models with capacities of 365 and 600 cfm. The larger machines are mounted on four-wheel carriages.

For further information write to The Jaeger Machine Co., 550 W. Spring St., Columbus 16, Ohio, or use the Request Card at page 18. Circle No. 38.

Sewer structure manual

■ A revised edition of its 48-page manual on sewer structures is available from Armco Drainage & Metal Products, Inc. The book covers such subjects as structural durability, material durability, selection of structures, factors influencing capacity, joints and fittings, and linings for failing sewers.

Installation design and reference data are included, as well as seven pages of graphs showing discharge of pipe based on Mannings' formulas.

To obtain Manual CMS-7456 write to Armco Drainage & Metal Products, Inc., 703 Curtis St., Middletown, Ohio, or use the Request Card at page 18. Circle No. 2.

New line of truck mixers

■ The new line of Rocket transit mixers is described in a bulletin from the Concrete Transport Mixer Co. The line is available in seven models with the largest, Model 65, having a rated capacity of 6½ cubic yards. The bulletin lists 11 major features of the new line. Several of the major features are illustrated.

To obtain this bulletin write to the Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo., or use the Request Card at page 18. Circle No. 4.

Wire Rope at Work—At Hawley, in the beautiful, rolling Pocono Mountains, is a big hydroelectric plant operated by the Pennsylvania Power & Light Company. Thirty or more years ago, PP&L constructed a wood-stave flow line connecting the plant to the Lake Wallenpaupack dam, 3½ miles away. Approximately 8500 ft of this system was recently replaced with a huge steel pipe line, 14 ft 8 in. in diameter. The photograph shows one stage of construction work.

Lifting the ponderous fabricated pipe was a job in itself. But with Bethlehem wire rope handling the principal lifts, the task of moving the heavy sections was managed smoothly. It was the type of job that this strong, tough rope always takes in stride, no matter how heavy or cumbersome the load.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

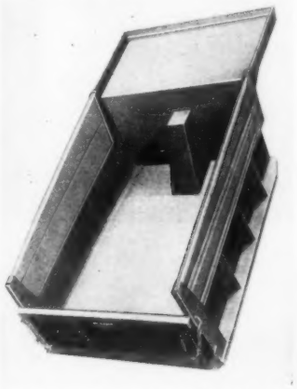
Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:
CONSTRUCTION • EXCAVATING • MINING • QUARRYING • PETROLEUM • LOGGING • MANUFACTURING

BETHLEHEM WIRE ROPE
BETHLEHEM STEEL

For more facts, use Reader-Reply Card opposite page 18 and circle No. 308

Tapered sideboards and load-carrying cab shield

■ A new tapered sideboard and load-carrying cab shield combination, said to improve load distribution and increase payload capacity within legal limits, is announced by the Galion Allsteel Body Co. Designed for use on Galion Series N and NF dump bodies in conjunction with Galion Uni-scopic



A Galion Model 12N-4F body with a full load-carrying cab shield plus straight and tapered sideboard extensions.

or Duo-scopic front-mounted telescopic hoists, the new combination permits over-the-cab loading.

This type of loading shifts the load center of gravity forward and places more weight on the truck's front axle. According to the manufacturer, shifting the weight forward allows more payload to be added without the need for raising the weight on rear or front axles above legal limits.

The tapered sideboards are available in heights of from 6 to 18 inches. The sideboards are fabricated from 10-gage high-resistant steel. For severe service applications, 8-gage steel is available. The load-carrying cab shields are offered in sizes and types to meet individual job requirements.

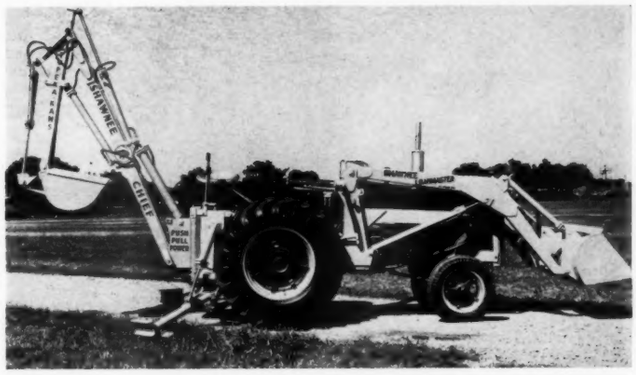
For further information write to the Galion Allsteel Body Co., Galion, Ohio, or use the Request Card at page 18. Circle No. 95.

Construction buildings

■ Literature describing its line of prefabricated construction buildings, which reportedly can be erected or dismantled in 2½ hours, is available from Economy Buildings, Inc. Four six-sided base buildings, the largest measuring 18×20 feet, and a variety of extension panels with matching roof and floor sections are included in the line. The base units are complete with floor, roof, double or single doors, windows, standard or chimney ventilators, 4 x 4-inch sills or skids, and one primer coat of paint on exterior walls.

The literature describes the complete line of buildings and extensions with photographs and diagrams. Illustrations of typical applications and a series of photographs showing the steps involved in the erection of a building are also included.

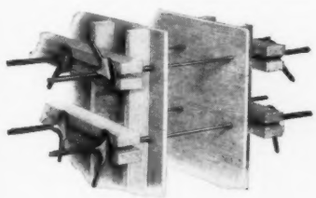
To obtain this literature write to Economy Buildings, Inc., Thomas St., West Chicago, Ill., or use the Request Card at page 18. Circle No. 40.



THE SHAWNEE LOADMASTER Model LM-3A loader and Chief Model D-90 backhoe are now available to fit the International Harvester W-400 tractor. The Loadmaster lifts 3,500 pounds to 9 feet. It can be installed or removed from the tractor in 20 minutes. Attachments available to replace the bucket include a bulldozer backfill blade, a 76-inch utility bucket, a 66-inch material bucket, and a weight box. The Chief backhoe digs efficiently to 14 feet below ground level. It has a horizontal reach of 20 feet. The backhoe operates in three 120-degree quadrants which may be changed by the operator from his seat. For further information write to the **Shawnee Mfg. Co.**, 1947 N. Topeka Ave., Topeka, Kans., or use the Request Card at page 18. Circle No. 54.

SUPERIOR

All the Accessories For Dependable Concrete Forming!

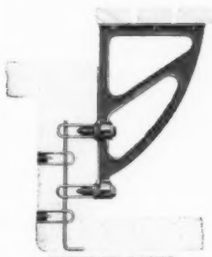


TILT LOCK CLAMPS

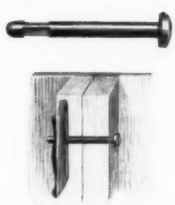
SNAP TIES

STANDARD COIL TIES

CONE-FAST COIL TIES



RISERFRAMES



PANEL LOCK BOLTS

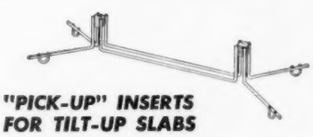
ROD CLAMPS

COIL LOOPS

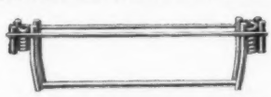
SCREW ANCHORS AND BOLTS

STANDARD HANGER FRAMES

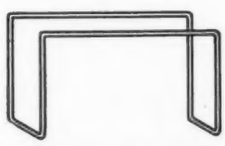
ADJUSTABLE SCREED CHAIRS



"PICK-UP" INSERTS FOR TILT-UP SLABS



SPECIAL HANGER FRAMES



WIRE BEAM SADDLES

Shown here are some of the many types of Form Ties, Anchors, and other concrete accessories which SUPERIOR'S years of engineering and field experience plus manufacturing dependability have developed and produced.

Every item in the SUPERIOR line is specifically designed to provide the most dependable and efficient forming method for ordinary foundations, engineering structures, watertight walls and architectural concrete.

When you plan form work, SUPERIOR'S experienced engineers are available to prepare suggested layouts of form work as well as complete estimates and quotations.

For details request copy of our COMPLETE CATALOG

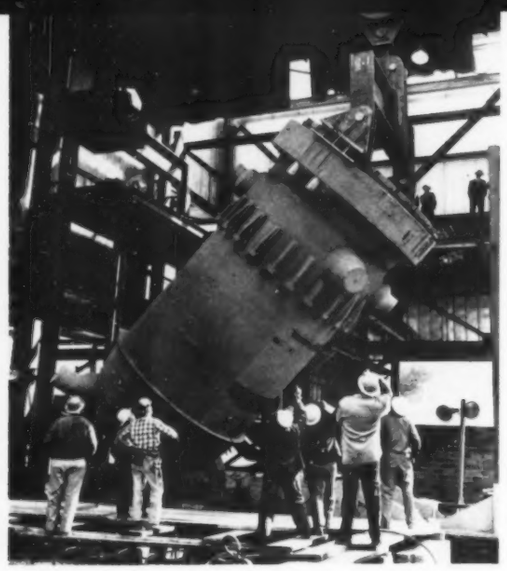
SUPERIOR CONCRETE ACCESSORIES, INC.

9301 KING ST., FRANKLIN PARK, ILL. (A suburb of Chicago)

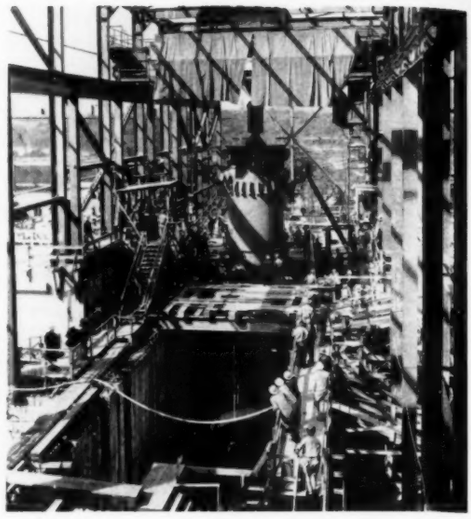
New York Office: 1775 Broadway, New York 19, N. Y.

Pacific Coast Plant: 2100 Williams St., San Leandro, Calif.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 309



Arriving at the Duquesne Light Co.'s Shippingport, Pa., atomic power plant, the 153-ton reactor vessel is lifted from the flatcar by the overhead crane and special handling equipment that had been pre-tested by Dravo engineers.



An hour later, the reactor vessel is swung directly over the opening of the reactor sphere in which it will be housed. The bottom of the unit barely clears the wooden beam platform over the canal.

Special suspension rigging is key to sett

The special problems involved in installing a piece of equipment weighmore than 150 tons become more complicated when the unit has to be handled with the precision a watchmaker uses in his job.

Engineers of Dravo Corp., Pittsburgh, Pa., and Westinghouse Electric Corp., Schenectady, N. Y., found this out at first hand during the installation of the atomic reactor vessel at the AEC-Duquesne Light Co. atomic power station in Shippingport, Pa.

The entire nuclear portion of this plant, including the 153-ton vessel that will contain the reactor, is being installed by Dravo for Westinghouse, the designer of the plant for the Atomic Energy Commission.

Moving heavy vessel

Handling the steel reactor vessel was the toughest part of the job. The vessel arrived by flatcar and was moved by an overhead crane to a point directly over the opening of the reactor sphere. The vessel was then lowered 35 feet into the sphere and attached to a specially constructed suspension system. Here the vessel will remain until insulating walls are installed around it. Then it will be lowered another 5 feet and made fast to permanent supports.

The job of moving the vessel from the flatcar to the opening of the sphere took more than an hour, and another nine hours were needed to shift the vessel from the crane to the suspension rigging.

Preparation a big task

But behind this were many more hours of preparation for the actual moves. Almost two weeks before the job started, Westinghouse and Dravo engineers were busy, making sure that the crane, other equipment handling rigs, and the suspension rigging would support the weight of the big reactor vessel.

Using a test weight frame which they had fabricated, Dravo workmen

spent ni
and riggi
loads of
final loa
testing c
gots. Thi
of the r
beam ha
provide
hook.

The s
with 37
of the
245 ton
pension
the weig
steel be
the ins

LEAP CONCRETE

FRANCHISES MEAN GREATER PROFITS ON TURNPIKE JOBS!

Shown at Left: Bridge beams for Florida Turnpike manufactured by R. H. Wright & Son, a LEAP FRANCHISED prestressed products manufacturer.

You too can share in these profits - - Franchises available in some localities - write LEAP Concrete, Inc., Lakeland, Fla.

FREE! LEAP Concrete, Inc. P. O. Box 1053 Dept. B-19, Lakeland, Florida

Send information about LEAP Prestressed Products; Franchise ☐, Double Tee ☐, Joists ☐, Beams ☐, Piling ☐

NAME _____

ADDRESS _____

CITY _____ STATE _____

I am an: Architect ☐ Engineer ☐, Contractor ☐ We are interested in a LEAP FRANCHISE ☐

For more facts, use coupon or circle No. 310

For greater performance . . . lower costs . . . day in and day out . . . it's

Dollar for dollar—feature for feature—CMC construction equipment is your BEST buy! It's backed by close to half a century of manufacturing experience and know how. If you're looking for BIGGER PROFITS — then you're looking for CMC! CONSTRUCTION MACHINERY COMPANY, Waterloo, Iowa.

CMC JOB MIXERS are the biggest money makers in the mixer field. 3½ to 16 cubic foot models. WRITE FOR CATALOG!

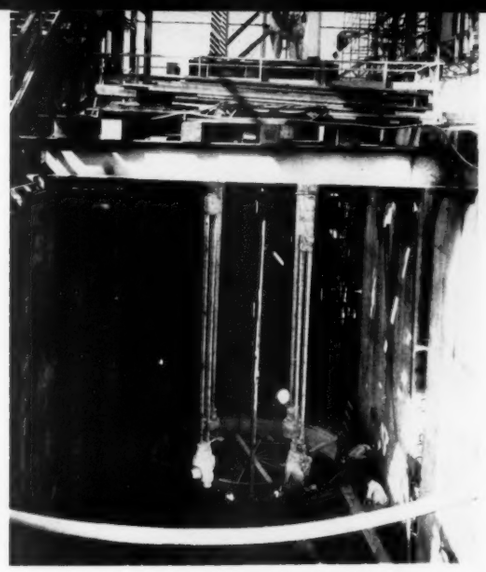
CMC's large variety of types and sizes of pumps—assure lower cost water handling on any construction job! At left, 10" Dual Primer; at right, SKWEE-GEE diaphragm

A COMPLETE LINE OF AMERICA'S FINEST

- TRUCK MIXERS 4 to 7-yard mixing capacities
- BUILDING MIXERS from 3½S to 16S
- CENTRAL PLANT MIXERS—from 16S to 84S
- PLASTER AND MORTAR MIXERS from 3½ to 12 cubic feet
- PUMPS—Dual Primers from 1" to 10", diaphragms, others.
- HOISTS—Many models. Single, multiple drums to 45 H.P.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 311

Extensive test of heavy support system precedes installation of 153-ton steel vessel in nuclear section of power station



Insulating walls are installed around the vessel as it hangs inside the reactor sphere. The suspension system consists of four sets of steel cables, each with a 90-ton lifting capacity, attached to 20-foot 4½-inch-diameter eye-bolts passing through steel beams.

ke/o setting atomic reactor vessel

spent nine days testing both crane and rigging with successively heavier loads of 6½-ton steel ingots. The final load on the frame during the testing of the crane came to 23 ingots. This simulated both the weight of the reactor vessel and the steel beam harness bolted to the vessel to provide a pickup point for the crane hook.

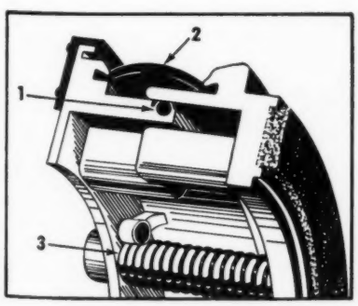
The suspension system was tested with 37 ingots. These with the weight of the frame made a total load of 245 tons. This test proved the suspension system capable of bearing the weight of the reactor vessel, the steel beam harness, and the weight of the insulation layer and the inner and outer neutron shield tank walls.

Heavy rigging to complete job

Much of the 15-ton suspension rigging for the vessel was manufactured at Dravo's Neville Island plant. The vessel is suspended from four sets of 2-inch-thick steel cables, each capable of lifting 90 tons. These cables are attached to four giant eye-bolts, each 20 feet long and 4½ inches in diameter, which extend through two sets of heavy steel beams across the top of the fuel-handling canal. The eye-bolts are held in place by huge nuts. Each nut-and-bolt combination weighs approximately one ton.

When the vessel is completely insulated, and the neutron shield tank is set in place, the vessel will be eased into its final position by eight 75-ton-capacity jacks, operated manually, that are located at the top of the suspension rigging. Since the vessel has to be lowered into place with only an infinitesimal tolerance, the nuts on the eye-bolts will be pre-set at the desired level and the vessel will be jacked down until the nuts rest on the supporting beam.

After the inner and outer neutron shield tank walls are attached to the reactor vessel, the entire unit will rest on and be welded to a steel base set in the concrete floor of the reactor sphere. THE END



Give Your Tractor Double Protection Against Final Drive Lubrication Loss

Sure-Seal®

FINAL DRIVE BELLOWS SEAL

Sure-Seal Features

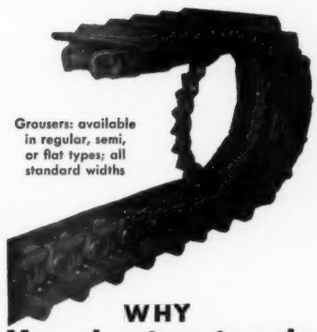
- **Outer Bellows Seal impervious to grease and oil.**
- **Inner "O" ring seal gives double protection.**
- **Heat-treated springs hold leather and cork sealing faces tight without adjustment. Give long life, positive sealing against dirt and water.**

Sure-Seals protect your tractor against loss of final drive lubricant by using an inner seal in addition to the regular outer bellows seal. This extra seal is a neoprene "O" ring riding inside two metal flanges which prevents the lubricant from reaching the bellows. Protect your investment, guard against down time—install Sure-Seal Final Drive Bellows Seals with double protection. Made for Caterpillar D-4, D-6, D-7, D-8 and TD-24 tractors.

LOCKS GREASE IN—DIRT OUT

Sure-Seal Equipment Co. 1820 N.W. 25th AVE., PORTLAND 10, ORE.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 312



Grousers: available in regular, semi, or flat types; all standard widths

WHY

Kensington track

LASTS SO LONG

There are two reasons why these tracks give you longer service, even under severest working conditions: (1) KENSINGTON's new, improved design, and (2) superior, wear-resisting alloyed manganese steel.

New Design. Rigidity and near-perfect alignment are made possible by one-piece rail design and special heat-treated alloy pins pressed tightly in place under high pressure. Anti-shear lugs on grouser plate fit snugly over tie bar of link to eliminate loose plates, elongated bolt holes, twisting, weaving, and side-sway ... the most common causes of bolt loosening and track trouble. Grousers are heavied-up at all critical points to better resist bending and breaking.

Yet, despite all these improvements, KENSINGTON *Track Assemblies fit all standard, popular make crawler tractors.*

Steel with Stamina. Special, hard, tough, KENSINGTON-developed alloyed manganese steels actually fight back against wear! They constantly develop extra surface hardness when exposed to friction, abrasion, and impact.

KENSINGTON tracks come from the factory ready-assembled, easy to install.

Discover for yourself how much KENSINGTON tracks will lower your maintenance costs and improve your operating efficiency. Coupon will bring details.

ERG Kensington STEEL COMPANY

SUBSIDIARY OF POOR & CO., CHICAGO

KENSINGTON STEEL CO.
Dept. A, 505 Kensington Ave., Chicago 28, Ill.

● Please send information on crawler tracks for tractor described below. I understand I will be under no obligation.

Make of tractor_____
Model_____ No. links per belt_____
Width of grouser_____
NAME_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE_____
STATE_____

For more facts, use coupon or circle No. 313

The Compac can be assembled in less than one hour and installed on a pickup truck in 10 minutes. It is attached to the truck by four bolts.

Cabin for pickup truck installed in 10 minutes

■ A cabin for enclosing pickup trucks that can be installed or removed in 10 minutes is announced by the Supreme Metal Products Co. The Compac provides the protection of an enclosed truck when needed, without eliminating the utility of an open pickup. The unit weighs 150 pounds and is securely attached to the truck with four bolts.

The Compac is of aircraft-type aluminum construction. It can be completely disassembled for economical shipping. Less than an hour of time and only a screwdriver and a wrench are required to put it together. It can seat six.

For further information write to the Supreme Metal Products Co., 11926 Woodruff Ave., Downey, Calif., or use the Request Card at page 18. Circle No. 70.

Rust-preventing coatings described in manual

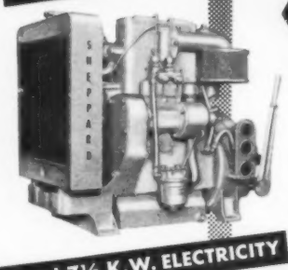
■ A coatings manual that provides a guide for all buyers and users of protective coatings is available from the Rust-Oleum Corp. The manual contains information and recommendations which enable a user to quickly and accurately determine the specific coatings needed to protect practically any rustable metal surface.

The basic principle of the company's fish-oil penetration through rust and into the pores of metal is explained and illustrated. Many other photographs show applications of the preventive coatings on girders, tanks, piping, fences, gutters, roofs, and equipment.

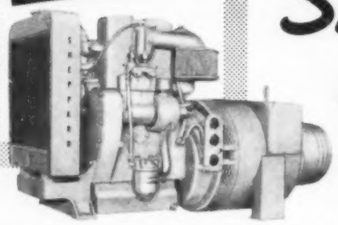
More than 100 color chips show the range of colors available in primers; faster-drying abrasion-resistant indoor and outdoor short oil coatings for use where dampness, salt air, and spray fumes are present; and long oil coatings where normal fumes, smoke, gas, and weather conditions exist. A further breakdown by end uses shows color chips and gives complete technical descriptions of Rust-Oleum coatings in original manufacturer's colors for equipment and machinery.

One section is devoted to Galvin-Oleum, a coating for new or old un-

20 HORSEPOWER



5 and 7½ K.W. ELECTRICITY



DIESEL

SAVES COST OF PERIODIC ENGINE REPLACEMENT

There's practically no end to the operating life of a Sheppard Diesel . . . every part subject to wear is replaceable. If you are using 20 H.P. engines or 5 to 7½ K.W. generating sets in heavy-duty service, a switch to Diesel will pay. Write for Sheppard Model 17A engine or generating set data today.

IT'S A CINCH TO SWITCH TO Sheppard

THE SIMPLIFIED DIESEL — LOW COST · LOW WEIGHT · COMPACT

Engines and A.C. generating sets shipped from stock within 24 hours

SOLD AND SERVICED by more than 2,000 dealers

FITS INTO SAME SPACE AS YOUR PRESENT ENGINE

17" narrow • 22½" short 26" low • fan-to-flywheel

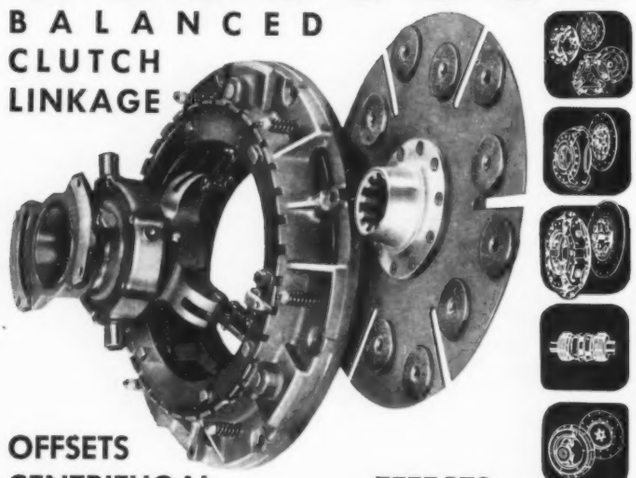
SHEPPARD DIESELS • HANOVER 39, PA.

Builders of Diesel Engines, Transmissions, Rear Axles & Power Steering Units for Industry

For more facts, use Reader-Reply Card opposite page 18 and circle No. 314

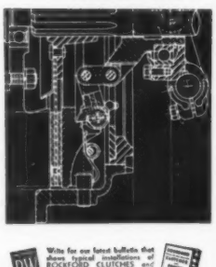
ROCKFORD

BALANCED CLUTCH LINKAGE



OFFSETS CENTRIFUGAL EFFECTS

Disengagement of ROCKFORD Over-Center Clutches is positive. It is accomplished by a linkage arrangement which is counterbalanced to offset the effects of centrifugal force — prevalent in modern *high-speed engines*. Give your product this and several other advantages — by specifying a ROCKFORD clutch.



Write for our latest bulletin that shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS, with dimensions of prices, applications, capacity tables, dimensions and specifications.

ROCKFORD Clutch Division BORG-WARNER

314 Catherine St., Rockford, Ill., U.S.A.

Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.

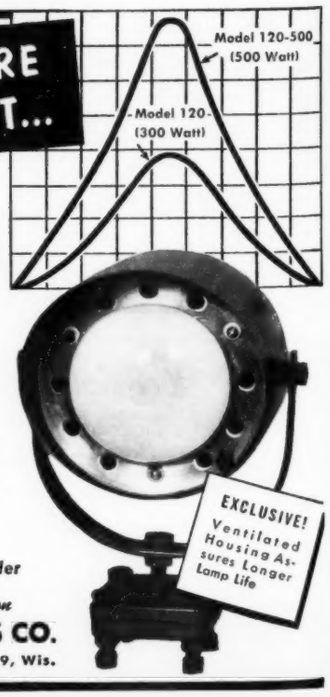
CLUTCHES

For more facts, use Reader-Reply Card opposite page 18 and circle No. 315

GET 59% MORE LIGHT OUTPUT...

From Model 120 500 Watt

STURDILITE FLOOD LAMP



- Steps up night-time production —
- Adds to SAFETY! . . .
- Especially Adapted for Operations Such as Open Pit Mining, Stripping, Dredging, Excavating, Crushing and Mix Plants, Logging, Road Building, Drilling, Quarrying, Etc.

WRITE For Illustrated Folder

Metal Spinning Division

PHOENIX PRODUCTS CO.

4727 N. 27th St. • Milwaukee 9, Wis.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 316

painted galvanized, aluminum, and terne surfaces that require no etching or extensive weathering. Also detailed are heat and chemical-resistant coatings, floor and masonry coatings, a clear liquid sealer, and Surfa-Etch, a solution for cleaning, etching, and neutralizing concrete surfaces.

To obtain Form No. 256 write to the Rust-Oleum Corp., 2799 Oakton St., Evanston, Ill., or use the Request Card at page 18. Circle No. 69.

Concrete breaking tool

■ A new tool for breaking concrete is announced by Brunner & Lay, Inc. The Keen-Kut is said to do a fast job without the need for constant re-

The Keen-Kut concrete breaking tool is said to work fast and require a minimum of resharpening.

sharpening. Designed to direct the force of the impact, the tool reportedly will not stick.

The new tool is available in diameters of 1⅛ and 1¼ inches. The cutting head is 6 inches long and the shank is available in 14 and 18-inch lengths (measured from the collar).

For further information write to Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill., or use the Request Card that is bound in at page 18. Circle No. 24.

Pa. Turnpike Commission moves headquarters

The Pennsylvania Turnpike Commission has moved to a new administration building, located on the turnpike, at the junction of Harrisburg East Interchange and Bypass U. S. 230, Harrisburg, Pa. The new post office box number is 531.

New portable conveyor has swiveling concrete chute

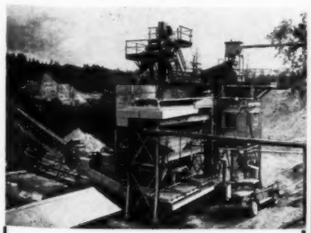
■ A new portable concrete conveyor featuring a swiveling concrete chute, a belt wiper, and a concrete hopper is announced by The Fairfield Engineering Co.

The 40-foot conveyor has an 18-inch-wide belt running on triple troughing-type idlers. A self-cleaning foot pulley is located at the foot end.

The Model 618B's capacity varies with the slump of concrete used and

with the discharge height. At a discharge height of 16 feet, approximately 24 cubic yards of concrete can be handled per hour. The conveyor may be raised to 26 feet.

For further information write to The Fairfield Engineering Co., Barnhart St., Marion, Ohio, or use the Request Card at page 18. Circle No. 67.



Plan To Produce Your Own Aggregate?

Consult EAGLE About Washing-Classifying Equipment!

Eagle pioneered concrete aggregate washing - classifying - dehydrating equipment, Eagle engineers have vast experience. Eagle has more installations than all other makes combined. Eagle has the broadest line. Nationwide factory trained sales-service organization.

EXPERIENCE, PROGRESS, SERVICE, SINCE 1919

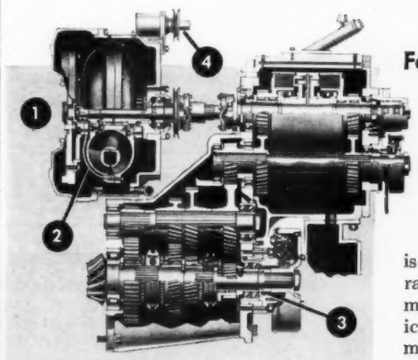
EAGLE IRON WORKS

159 HOLCOMB AVE., DES MOINES, IOWA

For more facts, circle No. 317

190 HP

NEW POWER-Flow Adams 660 with Torque Converter



1. 190 hp Cummins or General Motors Diesel Engine (not shown).

2. Torque Converter — Adams single-stage type. Multiplies torque 3-to-1—provides infinite gear ratios—absorbs shock loads to prevent engine lugging or stalling.

3. Constant-Mesh Transmission—with power clutch for forward-to-reverse motion without shifting—4 speeds forward to 27.4 mph, 4 reverse to 24.4 mph.

4. Tail-Shaft Governor—adjusts engine speed automatically to maintain constant grader speed preselected by the operator.

Forward speed to 27.4 mph — reverse to 24.4

New POWER-*Flow* Adams 660 works at all times at fastest possible speed and highest efficiency. Its torque converter automatically balances speed and applied power to match the load. Engine torque is multiplied 3-to-1 in infinite gear ratios. Tail-shaft governor supplements torque converter by automatically adjusting engine speed to match variable load conditions.

This maximum flexibility in power transfer provides a cushion against load shock, reduces wear and maintenance on engine and transmission. When bucking varying heavy loads, frequent gear-shifting is eliminated . . . no engine stalling. Operators get *more* work done — with *less* effort.

Shift forward to reverse with simple foot control

Adams power-shift clutch shifts instantly in any gear range — from forward to reverse, reverse to forward — with the simple movement of a foot pedal. This leaves operator's hands free for steering and for more accurate control of blade.

POWER-Flow "660" offers many extra advantages:

Power Steering — gives the "feel" of hand steering, with hydraulic power doing the work.

Double-Action Hydraulic Braking System — applies pressure to brake on transmission as well as to brakes of 4 tandem drive-wheels.

Engine Rubber-Mounted—with no vibration transmitted to machine. Reduces operator fatigue.

Foot Accelerator — makes driving on highways and through traffic as safe and easy as driving a truck.

Six Big Tires — 14.00 x 24 — adequate traction and flotation for work in any material or footing.

Slide-Shift Moldboard — shifts easily, right or left, for long reaches.

Optional Equipment — includes Power-Shift Moldboard, Scarifier, Cab, Bulldozer, Elegrader, V-type Snow-Plow and/or Wing, Snow-Blo Wing, and Rotary Snow-Plow.

Look into POWER-Flow Adams 660

See how this fast, 190 hp grader can help keep your heavy work ahead of schedule. *Write for details.*

Adams, POWER-*Flow*—Trademark AG-1262-G-b-6

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Where Quality is a Habit

For more facts, use Reader-Reply Card opposite page 18 and circle No. 318

The engineering department

Variables in concrete and form work

by GEORGE E. DEATHERAGE, P. E.
construction consultant

In estimating the costs of concrete construction, the estimator or project engineer will have to secure the prices for each of the material items going into a permanent structure, multiply them by the amount of a certain material used, then add the total cost of all the materials together.

Concrete, for instance, is either designated as a certain proportion of cement, sand, and gravel per cubic yard of mixed concrete, or—as is more the current practice—in ultimate compressive strength in pounds per square inch. Estimates are prepared as to the number of cubic yards containing 27 cubic feet of material.

All materials going into a specific concrete mix have to be priced according to current rates and the amounts used. Aggregates for concrete are mainly sold by the ton, for instance, and on the basis of carload lots, f.o.b. These tonnage prices will have to be converted into yardage prices by the estimator—if his tabulations of mixtures are based on volumes. The weight of material per cubic foot is used as the conversion factor.

In a few localities, aggregates are sold by the cubic yard. Some sellers base their prices on truckload lots of five tons or more; others quote f.o.b. quarry. A few will allow a 5 per cent discount for cash, while others will have only a 2 per cent discount rate. Some will include the sales tax in the price, other sellers may not. The estimator will have to be familiar with all these details when he starts building up the composite price of concrete mix.

Portland cement is usually priced per barrel in carload lots. The cash discounts for contractors on truck deliveries is generally 2 per cent for cash on the tenth of the month. The carload delivery discount is usually ten cents per barrel, payment to be made within 15 days of the invoice.

Prices for this material are either set per barrel, for paper bags, or in bulk. The price for bulk portland cement is about ten per cent less than the bagged price.

Cement is only used in bulk on

DTA*
TRI-METRIC PROCESS
means longer life to...
Diamond Cutting Blades
Once again DTA* proves their leadership with "TRI-METRIC PROCESS", the new, exclusive development that guarantees you the finest quality diamond grit fused with the proper bond grading, concentration and depth of diamond section. Test check and convince yourself that DTA* Diamond Concrete Cutting Blades give you better, faster, freer cutting and longer blade life!
RUGGED . . . ECONOMICAL
6 big reasons why DTA* is your best buy
1. Outstanding research and development.
2. Precise control of manufacturing process.
3. Highest quality diamond BOART.
4. The best in metal bondings.
5. Top quality steel centers.
6. Complete sales and field service by experienced personnel selected for their knowledge of your cutting problems.
DTA* Concrete Cutting Machine
The best combination for better concrete cutting . . . DTA* Concrete Cutting Blade and Concrete Cutting Machine! Lightweight, ruggedly built unit capable of heavy duty work as well as trenching, joint cutting and patching.
*DIAMOND TOOL ASSOCIATES
P. O. BOX 85
HAWTHORNE, CALIFORNIA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 319

FINEST PRECISION SWIVELS IN THE WORLD
There are many practical, diversified uses for Miller Swivels, in capacities from 700 lbs. to 250 ton. 16 different styles in stock . . . special adaptations designed on request.
SCRAP MAGNET HOOK UP
80 TON PLACEMENT
90 TON TRANSFORMER
HYDRAULIC TOWERS
MILLER WEDGE SOCKET
Miller
BALL BEARING SWIVELS
Products
PRODUCTS OF
GENERAL MACHINE & WELDING WORKS inc.
1100 East Second St., Pomona, Calif.
P.O. Box 938 — Dept. C-2
R. G. Moeller Co., Detroit & Grand Rapids, Mich., W. H. Ziegler Co., Minneapolis, Minn., Funkhouser Mach'y Co., Kansas City, Mo.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 320

This is the fourteenth of a series of articles on Construction Management by George E. Deatherage, P. E., construction consultant. The articles are based on an eight-volume "Manual of Advanced Construction Management" published by Geo. E. Deatherage & Son, P. O. Box 921, Lakeworth, Fla. The manual is used in a training course for superintendents and project managers, and is directed primarily at those contractor employees who have reached the foreman level or its equivalent, and who need practical help in order to take complete charge of construction projects themselves.

large jobs; at ready-mix plants; and on jobs that have been properly equipped for unloading, storing, and handling the material.

Reinforcing

On some projects, steel reinforcing required will have to be figured into the estimate for concrete work. Prices for this item, as for any other material, depend on the type of the material and the amount to be used.

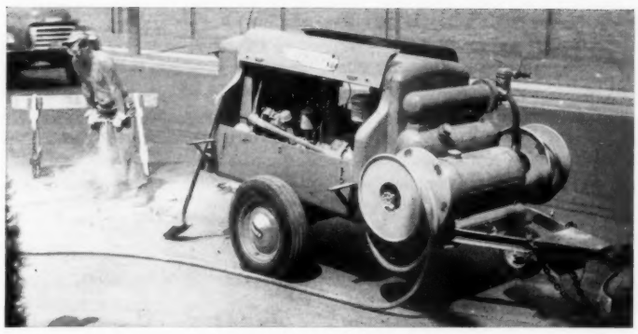
Steel reinforcing bars are designated by "bar number", the numbers being based on the number of eighths of an inch included in the nominal diameter of the bars. The nominal diameter of a deformed bar is equivalent to the diameter of a plain bar having the same weight per foot as the deformed bar.

Two standard grades of reinforcing bars in common use are those from new billet steel and those from re-rolled or rail steel, and the price for both is practically the same in stock mill lengths. Quantity prices will vary in lots of from five tons to a carload.

Anyone estimating reinforcing steel should list the quantities and weights of each size of bar separately, making the proper allowances for such things as laps and bends.

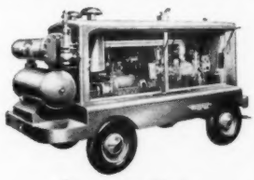
Whenever reinforcing has to be bent to shape, the estimator will find it cheaper to have the work done in the shop rather than at the site. If it is bent at the site, ironworkers will have to be paid for their labor at the current rates and higher insurance rates will have to be paid by the company to cover the men in this trade. In most places, fabricating shops handle this class of work at a stated price per ton. The same is true of the fabrication of stirrups, spirals, and other specials. The estimator should also take into account the fact that the cost of making working drawings, bending details, and setting plans will vary with the volume of work and the size of the rods. And delivery charges will vary according to the size of the rods, the volume of work handled, and the distance the rods have to be hauled to the site. Volume of work, bar size, the location of the

(Continued on next page)



Note full size tool boxes, retractable dolly, spring towing eye.

Work moves faster with a Jaeger Rotary



Other sizes to 600 cfm

At slower operating speeds than other rotaries (less fuel, less wear) the Jaeger "125" gives your crews constant 100 lbs. pressure for all demands up to 125 cfm. Keeps full wallop in two 80 lb. breakers. Ask your Jaeger distributor to show you how quietly and evenly it runs — or send for Catalog JCR5.

THE JAEGER MACHINE COMPANY • 701 Dublin Ave., Columbus 16, Ohio

PUMPS • MIXERS • TRUCK MIXERS • SPREADERS, FINISHERS • LOADERS

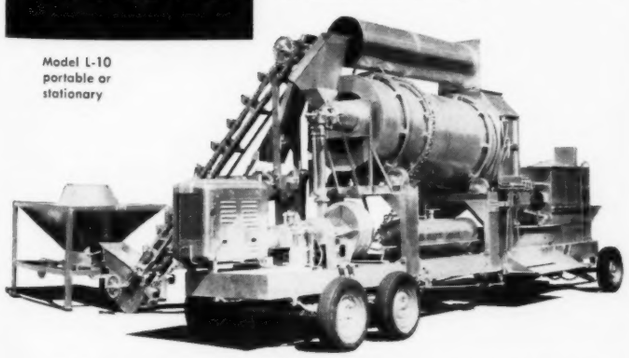
For more facts, use Reader-Reply Card opposite page 18 and circle No. 322

White

NEW ASPHALT PLANT

$13,500 (f.o.b. factory)

Model L-10 portable or stationary



20 tons per hour hot mix capacity

Batch type 1000 lb. pug mixer with air-controlled gates. Has built-in asphalt heating kettle, reciprocating plate aggregate feeder. 50 hp engine or 30 hp electric motor. Write for catalog and name of nearest dealer. White Manufacturing Company, Elkhart 9, Indiana.

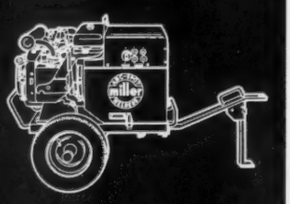
ONE MAN LOADS . . . ONE MAN OPERATES!

For more facts, use Reader-Reply Card opposite page 18 and circle No. 321

"...if it's Miller you know it's the finest..."

Famous Miller ac arc welder design teams here with equally famous Onan engine to deliver exceptional performance.

The Miller AEA-200-L supplies welding current *and* power for lights, tools, heat. Here's all-weather, any-terrain, lightweight versatility that combines 5 KW of 110/220 v. ac with 1 KW of 115 v. dc continuous power while welding. Full 225 amperes with 100% duty cycle rating. Larger units to 350 amperes.



Optional equipment includes road trailer and running gear.

miller ELECTRIC MANUFACTURING CO., INC.

APPLETON, WISCONSIN

distributed in Canada by CANADIAN LIQUID AIR CO., LTD. Montreal

For more facts, use Reader-Reply Card opposite page 18 and circle No. 323

project, and wage scales—all of which will influence the cost of the work—have to be added to the total cost of this item. Unless the estimator has historical costs for similar work done recently, the estimated cost of the work will have to be tabulated for reinforcing steel. In compiling the unit cost, the major items to be considered are the costs of cars f.o.b., loading and trucking to the site; unloading, sorting, and stacking; making working drawings, bending lists, and setting plans; cutting and bending; transportation to the building hoist; hoisting the items to upper floors (if any); the cost of bolsters and chairs and the cost of placing these items; and placing and tie reinforcing.

All these factors do not cover all contingencies encountered on particular jobs, and it is best to prepare a simple process chart of each step and operation and price each unit of work individually to get the total cost of the work.

Reinforcing fabric, sometimes used in concrete work, usually comes in rolls of 750 square feet and is sold per 100 square feet. Since there is a wide variation in price for mesh, the estimator will have to use the same care in estimating the cost of this item as in estimating the cost of reinforcing steel. Technical data on reinforcing mesh can be obtained from manufacturers of the fabric.

Concrete mixing

In metropolitan areas, the "on site" mixing of concrete is virtually obsolete. Ready-mix concrete is almost universally used, since this makes it unnecessary for the contractor to provide storage space in confined areas for sand, gravel, and cement, as well as a considerable amount of expensive mixing equipment. If the amount of concrete to be used in the project is very large, however, it might be wise for the estimator to plan on setting up a plant to turn out the concrete, for this might be done at a great saving over the purchase of concrete from ready-mix organizations that have to make a profit for their services. Here again, a process chart of the operations will reveal the comparative costs of using ready-mix concrete or concrete mixed at the site by the contracting firm.

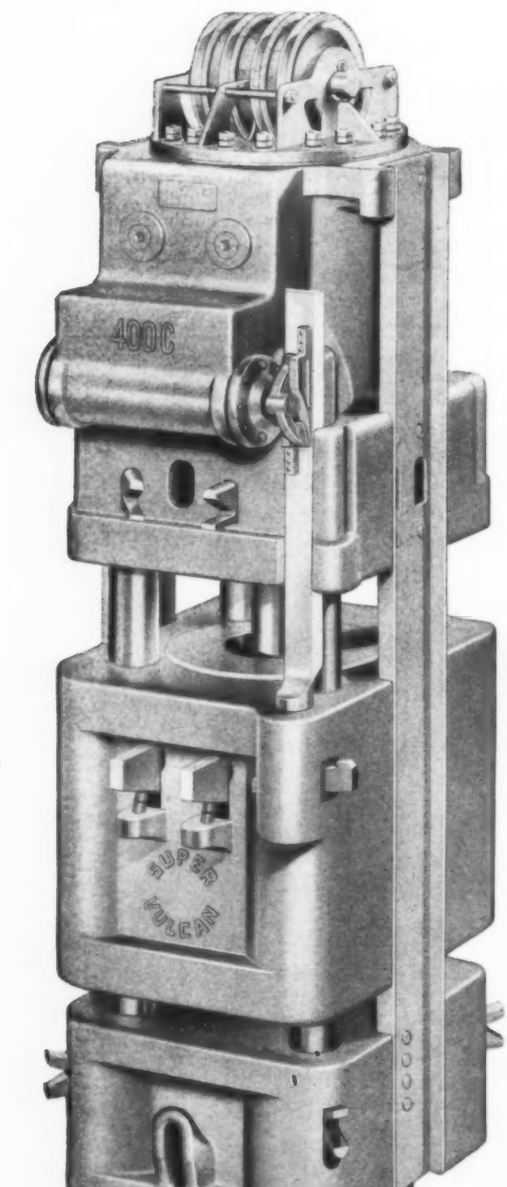
The per-cubic-yard cost of ready-mix concrete can be obtained from the producer. To this price, the estimator should add about three per cent to take care of charges for such things as delays and split loads.

The concrete plants that may be set up on the site by the contractor may range from the ½-yard portable mixer that is manually loaded to larger batch plants which handle all operations automatically. When the volume of work warrants it, a plant and equipment layout of the most advantageous kind of mixing plant should be made in the form of a flow diagram. Operations that will have to be used with the plant selected can then be worked out on a process chart or gang chart to find the average hourly output and cost. Both production and price can then be compared with that of ready-mix producers. In figuring of this kind, the estimator should remember that the prices compiled must include the cost of placing the concrete, since the use of ready-mix equipment will often be comparable to the contractor's use of units used to transport concrete to the point of placement.

Costs for concrete in roads, airports, and other types of paving is stated in square yards instead of cubic yards, and the invitation for bids on such projects will require the inclusion of the price for grading, fine-grading, compaction of the subbase, expansion joints, curing, and related work. Estimates prepared on this basis should be checked carefully by the estimator to make sure that all work has been included. If the request has been made on a unit price basis, the estimate will have to include all overhead and profit.

Forming

Concrete forms are estimated per



World's Largest Steam
PILE DRIVING HAMMER
Super VULCAN
Model 400-C

Striking Energy: **113,488 foot pounds per blow.**

Will Drive Piling in Excess of **80 Tons** Dead Weight and up to **12 Feet** in Diameter.

Drives Bearing Piles to Support **1,000 Tons.**

Gross Weight: **83,000 pounds.**
Ram Weight: **40,000 pounds.**

Hammer is approximately 60 Inches Square and 17 Feet in Height.

VULCAN IRON WORKS INC. 327 North Bell Avenue, Chicago, U.S.A.

For more facts, use Reader-Reply Card opposite page 16 and circle No. 324

For your concrete forming needs...
EFCO "LIFETIME" STEEL FORMS
available on a
PURCHASE BASIS

Increase profits, reduce costs—with EFCO "Lifetime" Steel Forms. They save time, material, money. Adaptable to wide use. Available in many types of regular and special sizes.

WRITE FOR CATALOG on EFCO "Lifetime" Steel Forms. And ask for details on Special Economy Steel Forms and the Economy Steel Form System on a rental basis.

Economy Forms Corp.
DES MOINES, IOWA

Offices in St. Louis, Mo.; Kansas City, Mo.; Lincoln, Nebr.; Minneapolis, Minn.; Ft. Wayne, Ind.; Milwaukee, Wis.; Chicago, Ill.; Cincinnati, Ohio; Cleveland, Ohio; Metuchen, N. J.; Rochester, N. Y.; Springfield, Mass.; New York, N. Y.; Washington, D. C.; Decatur, Ga.; Charlotte, N. C.; Dallas Texas; Tulsa, Okla.; Houston, Texas; Los Angeles, Cal.; Oakland, Cal.; Denver Colo.

For more facts, circle No. 325

square foot of contact area of the exposed surface and are classified in accordance with the purpose for which they are to be used. Some types of forms are very simple and require very little labor to make and erect; others are complex and expensive. The main classifications of forms include those for footings and foundations, walls, slabs, beams and girders, columns, stairs, curbs and gutters, superstructure, ornaments, and pan-type slabs.

Each of these classifications will require different amounts of materials and labor to make and erect. Quantities should be taken off the drawings and listed separately on the statement sheet. When this is done, the estimator can save time by listing the concrete quantities and the forms on the estimate sheet at the same time. In taking off the concrete, note the number of pieces and the dimensions in the columns provided and calculate the surface contact so that it can be posted in a divided "quantity column." Concrete and form quantities can be totaled at the bottom of the sheet. All figures should be calculated by using the decimal system to two places so that a machine calculator can be used to figure and check amounts.

In figuring the costs of building and erecting forming, the estimator will have to keep in mind a number of other variables that will affect the price of this item. Weather and temperature, local labor conditions, wage scales, the job site, the finish, the rate of pour, interference from other trades, form accessories, design and setting drawings, the re-use of forms, the method of handling, provision for easy stripping, inserts and openings, the slump of the concrete, fabrication methods, types of shores, and rental of equipment will all have a bearing on the estimated price.

Unless the contractor has personnel who will determine the manner of forming to be used and the design of the forms, this job will be done by the estimator. It is good practice, in this case, for the estimator to make a rough design for each classification of forming on a single estimate sheet and use this as a guide to his quantity takeoff. In this way, he will be able to figure the amount of lumber needed per square foot of contact area, and this can be used as a basis for pricing the labor and materials to be used.

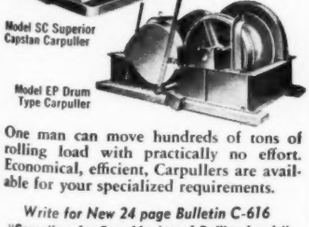
Concrete form design is influenced by several factors: dead and live loads to be imposed; horizontal pressures; rate of pour; the mix and its consistency; the temperature of the concrete; and the placing methods. Data on design to meet these factors can be obtained from most estimating and engineering handbooks. A considerable amount of informative data on form design may also be secured from any of the manufacturers of wood and metal forms for rental.

Lumber for concrete forms should not be kiln-dried, since it will swell and bulge. Wet lumber should also be ruled out for forming, since it may shrink and crack and produce a poor concrete surface. A No. 2 grade of partially seasoned wood, free of large knots and other imperfections, is suitable for most form work. When structures to be built are similar and forms may be re-used a number of times, thought should be given to designing forms that are easily removed. Plywood may be used profitably, particularly if the finished ap-

"Superior" Electric

Carpullers

CAPSTAN TYPE, DRUM TYPE AND SPECIAL TYPES



Model SC Superior Capstan Carpuller

Model EP Drum Type Carpuller

One man can move hundreds of tons of rolling load with practically no effort. Economical, efficient, Carpullers are available for your specialized requirements.

Write for New 24 page Bulletin C-616
"Carpullers for Easy Moving of Rolling Loads"

SUPERIOR-LIDGERWOOD-MUNDY CORPORATION

Main Office and Works: SUPERIOR, WISCONSIN, U. S. A.
New York Office, 7 Dey Street, New York 7, N. Y.

For more facts, circle No. 326

Preparing roads and building sites at Myrtle Beach Air Force Base, D Tournapull makes selective cuts and fills to grade roadway. Contractor estimates production at 7.1 cu. yds. per load, average 700 pay-yards per day.

5 contracts at Myrtle Beach Air Force Base

prove versatility of dirtmover

The real pay-off on a smaller-sized, self-propelled scraper is *versatility*. A. D. Plowden, Jr., of Sumter, S. C. has proved to his own satisfaction that yard-for-yard and dollar-for-dollar, you can't beat D Tournapulls for profitable "handyman" dirtmoving on moderate-sized jobs.

Contractor Plowden worked 7½ cu. yd. "D's" at Myrtle Beach Air Force Base, Myrtle Beach, S. C. This 4470-acre, World War II bombing and gunnery training base was converted by Corps of Engineers, U.S. Army, into an operational base for Tactical Air Command, 9th Air Force.

"D's" do many kinds of work

Since he started on the project Mr. Plowden has completed a wide variety of jobs on his subcontract. His D Tournapulls have hauled yardage for runway extensions, built dikes around oil-storage tanks, cut two 1300'-long ditches, hauled muck, and handled many other dirtmoving jobs.

50,000 yard site-development

Working for Industrial Construction Corp., Hampton, Va., Plowden prepared building sites and constructed roads. To handle this work, contractor brought in 2 D Tournapulls, a crawler-pusher, and a motor grader. The "D's" moved and spread topsoil, removed unsuitable material, hauled-in stable material, and prepared roadbeds and a railbed on the base.

When photo was taken, one "D" was cutting roads in an oil-tank area. Work was on a selective cut-and-fill basis. Tournapull took light cuts with the aid of the pusher . . . hauled fill to a low section of road, on cycles up to 1800' long. Plowden estimates that "D" heaps 7.1 cu. yds. of the sandy topsoil . . . hauls as much as 700 pay-yards per day on moderately short hauls over average terrain.

Contractor buys another D Tournapull

Mr. Plowden watched "D's" production closely, because he needed another self-propelled scraper to handle his expanding business. Two other scrapers were studied on demonstration, working side-by-side with his D Tournapull. One was a 7.0-9.0 cu. yd. unit powered by 143 hp engine; the other scraper demonstrated was a 172 hp, 10.0-14.0 yard machine.

After careful consideration of all factors, Plowden returned both demonstrators and bought another D Tournapull. His conclusion is that the "D" heaps as much dirt as the 7.0-9.0 yd. machine . . . turns faster, covers more ground, carries less deadweight . . . has more power-per-pound loaded and empty, and costs less.

Works well in poor footing, on hills

Plowden is pleased with D Tournapull's ability to load and haul dirt under adverse conditions. He says, "These 'D's' maneuver and work well in wet, spongy stuff. They've got the power and stability to do a good job on slopes, too!"

Edgar L. McNair, operator, states, "I've run two other small rigs, but the 'D' will *work* where the others won't go. Thing I like best is that it's easy to handle. I've operated for 10 years and this is the easiest . . . it doesn't take so much muscle-power."

Let us help you

Whenever *you* have earth to move, it will pay you to consider fast, rubber-tired Tournapulls. We will be glad to help you estimate costs and output. For specifications and detailed information, write or call us at any time.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-1066-8-b

New, 9-yd. go-anywhere D Tournapull

New Tournapull has increased capacity — to 9 yds. With 8' width, and under 9-ton axle-limit, "D" roads almost anywhere without permit.

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Where Quality is a Habit

For more facts, use Reader-Reply Card opposite page 18 and circle No. 327

pearance of the concrete is important.

In selecting and handling lumber for forms, the estimator should consider a number of things. If possible, he should use stock sizes of lumber, select material of proper strength, keep the number of form units and members as low as possible, provide necessary tolerance to take care of swelling, consider whether the forms can be re-used, and provide a way to facilitate stripping and removal without damaging the concrete. He should bear in mind too that materials of different lengths should be piled separately; wales, girts, and joists should be ordered in as few lengths as possible to save time in sorting; and wales should never be nailed to wall studs. In addition, the estimator should allow about 5 per cent additional lumber for waste. Allowance, also made for members to be used for stripping and battens, will eliminate a great deal of cutting of the regular stock. Material for bracing, batter boards, planks, and supports for runways should also be included in the estimate.

If prefabricated form panels are to be used, the estimator should check union rules for rates and regulations. These form panels can either be purchased, rented, or obtained on a purchase-option plan. Rentals are usually based on a two-month minimum with a 60-day purchase option. The rates generally include form ties, tie keys, or form lumber for bracing.

Several of the larger rental firms will prepare working drawings and details for form work, presenting a quotation for all the required forms and accessories. If the work is of any size, it is a good practice to secure such quotations.

If the work is small, drawings or sketches, together with bills of material and cutting lists may be supplied by the foreman. There are disadvantages to this: the workmen building forms from their own sketches will lose time on the actual job and this may more than offset the engineering expense that has been eliminated; then too, the average foreman is not trained to make allowances for pressures, temperatures, slumps, and other variables. Generally, it will be more economical to have the forms properly designed and billed out.

All the required materials, including all accessories, should be billed out on a bill of material form in the specific sizes and lengths required. If the work is of a considerable size, a separate bill of material should be made for each panel or piece to be duplicated. All cutting and ripping for a number of strips and battens can then be done on a power saw at once, eliminating hand sawing at a bench. When the job has been billed, a consolidated stock list of lumber can be prepared so that the lumber can be purchased.

The handling of the forms is another matter the estimator will have to consider. Room available for handling, access for trucks and equipment, the practicability of joining sections together and handling them as one unit with a crane, and, if necessary, the hoisting of forms into place on buildings or bridges will have to be planned early. Costs can be influenced by the number of re-uses of a form, and the fact that excavation and steel erection work may be thrown off schedule and more forms be needed than was originally estimated. Winter work will affect the schedules too, since forms cannot be stripped as quickly as they can in the summer months.

In most cases, some labor and materials will have to be allocated for form repair after each use. The amount of labor used on this work will vary, depending on how well the forms were designed for stripping. Cleaning and oiling will also be done by this force.

It is uneconomical to try to save money by cutting down on supervision while forms are being fabricated and erected. In figuring the

THE SURVEYOR'S NOTEBOOK

Reporting on Unusual Surveying Problems and Their Solutions
Notekeeper: W. & L. E. Gurley, Established 1845

A Few "Tricks of the Trade"

Unusual Field Tips Suggested by Readers of "The Surveyor's Notebook"

A Louisiana engineer has come up with an interesting method of locating shot points during seismograph surveys. The shot location was practically inaccessible in the bayous. However, general direction was known from two points on a base. When the shot was sent off, considerable dirt and smoke were blown into the air; and two transits intersected the shot to give location close enough for practical purposes. (*Speaking of inaccessible sights*, the Gurley Telescopic Solar Transit quickly gets around obstructions with sun shots. Procedure of carrying a line forward with a Gurley Solar eliminates one man from a party. The time and labor saved "pay off" the instrument in a few seasons. Write for information on Model 112-RT.)

Gurley Telescopic Solar Transit

* * *

For night work, an automobile spotlight can aid the surveyor greatly. One engineer directs his vertically... uses suspended plumb lines at right angles to each other to plumb the beam. The beam is used for signaling when the transit party is to take the sight... sight is taken on the vertical beam when it appears in the sky.

* * *

Some engineers ask for horizontal stadia lines on their transit reticles. This permits use of a horizontal rod—or even a common tape—for measuring distance. Using a right angle prism or Locke hand level with a right angle, a line is laid off perpendicular to the line of sight; and two targets such as pins or range poles are set on this line so that they are exactly matched to horizontal stadia. Distance between the two can then be measured, giving a means of determining stadia distance.

* * *

Can you use these field aids? *Gurley can supply 50-pound test yellow nylon plumb bob cord, to add to the visibility of your string in poor lighting. Also a cord adjustor, which helps you make quick changes in line length in the field. Send 25 cents in stamps or coin for a set of cord and adjustor with a drawing showing how to use them.*

* *

NEW EDITION OF "SURVEYOR'S NOTEBOOK": We have collected the most helpful, most discussed pages from Series One and Two of "The Surveyor's Notebook" in one 20-page book. These valuable field tips will help you use your own instruments with greater success. *Write for your free copy.*

W. & L. E. GURLEY

Fulton & Station Streets, Troy, N. Y.

GURLEY Surveying and Scientific Instruments

For more facts, use Reader-Reply Card opposite page 18 and circle No. 328

CAL-TIE® WIRE
in the handy reel dispenser

...Safe

Tying reinforcing bars with Cal-Tie Wire on the convenient reel dispenser is safer than the old-fashioned shoulder coil. There's no awkward coil to catch on protruding objects... no danger of eye injuries... no scratches on neck and ears... and Cal-Tie's unusually smooth surface makes tying easier.

...Economical

Cal-Tie Wire gives more ties per pound. That's because workers can cut the desired length they need... when they need it... don't have to clip off long, useless wire ends after each tie. They can perform other duties without discarding their partially-used supply of tie wire.

Your nearby CF&I representative will be happy to give you complete details on this safe, economical and modern way to tie rebars, etc. Why not see him soon?

CF&I **CAL-TIE WIRE**

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver
El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Oklahoma City • Phoenix • Pueblo • Salt Lake City • Wichita
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
CF&I OFFICES IN CANADA: Toronto • Montreal CANADIAN REPRESENTATIVES AT: Calgary • Edmonton
Vancouver • Winnipeg

For more facts, use Reader-Reply Card opposite page 18 and circle No. 329

price of form work, allowance should be made for a pusher under the foreman for each gang who will have some time to give to seeing that the work is progressing properly.

The number of variables involved in getting a composite unit price per square foot of forming should make it obvious that the best method to set up and plan a job of this kind is to make a process chart in pencil, listing all the steps and operations to be performed—and they may run from 55 to 60—and reduce them to eight or ten steps, each of which is priced. This is the only way that the estimator can be sure that an important item has not been overlooked.

(Next month's article will deal with "The engineering department — structural steel and miscellaneous iron.")

State Department building to be largest in Capital

The largest building yet to be built in Washington, D. C., is now under construction and expected to be ready by 1960. This is the new building for the State Department which at present occupies a small building originally intended for the War Department.

Located at Virginia Ave., and 21st St., the new structure will encompass the old one. The building, eight stories high, will cover two square blocks and provide more than five times the space than the old structure.

Extra features of the building include underground parking accommodations for 800 cars, central communications system, and international conference rooms wtih simultaneous interpreting equipment.

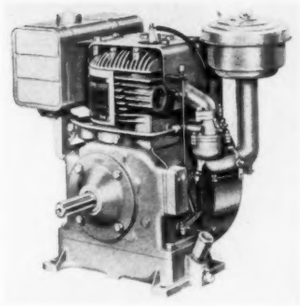
Chief architects are Graham, Anderson, Probst & White, Inc., of Chicago, and Harley, Ellington & Day Inc. of Detroit with A. R. Clas of Washington as associate on the new structure.

Accountants' ethics defined in new book

"Professional Ethics of Certified Public Accountants", by John L. Carey, who has had more than 26 years' experience as director of the American Institute of Accountants, has been published by the Institute.

The book deals with professional ethics and the public interest, professional competence, independence and integrity, opinions on financial statements, tax practice, management services, etc.

Gasoline engine develops 7 horsepower at 3,600 rpm



■ A new 7-hp gasoline engine has been added to the line of single-cylinder 4-cycle power plants manufactured by the Briggs & Stratton Corp. The Model 19 engine has a 3-inch bore and a 2⅝-inch stroke with a piston displacement of 18.56 cubic inches. It develops 7 horsepower at 3,600 rpm.

The cylinder and crankcase are made of close-grained cylinder iron. The base, cylinder head, bearing supports, piston, and connecting rod are made of aluminum alloy. The over-all weight is 78 pounds.

The carburetor is a concentric float type. The mechanical-type adjustable governor runs in oil and is fully enclosed. Lubrication is provided by a splash system.

For further information write to the Briggs & Stratton Corp., 2711 N. 13th St., Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 66.

The LIMA ROADPACKER
. . . faster high-density compaction at lower cost

The penetrating vibration of six heavy vibrating shoes compacts macadam bases and gravel sub-bases to specified densities.

Course aggregate for macadam bases up to 12" thick can be spread in a single layer, then uniformly compacted to final density over a 13'1" width with the LIMA Roadpacker.

Single spread, which is permissible only with the vibratory method, reduces material handling by one-half or more—it eliminates backtracking of spreading equipment and contour shaping is needed only once.

The action of the vibration "runs in" screenings to full depth of macadam with only three operations. Much of the labor formerly required to spread, broom and roll is eliminated.

The versatile LIMA Roadpacker performs with equal efficiency on both full-width and widening jobs.

Here's how the LIMA Roadpacker speeds up paving operations.

- Drives to job at 30 MPH.
- Compacts equally well traveling forward or reverse — no deadheading or turning around when two passes are required.
- Covers a 13-ft., 1-in. width, one half of a two lane road.
- Operator can easily fold end shoes for narrower working widths or for highway travel. Shoes are raised and lowered hydraulically.
- Low maintenance—all working parts are completely enclosed, can even operate under water or dirt. Shoes are driven hydraulically and are pressure-lubricated.

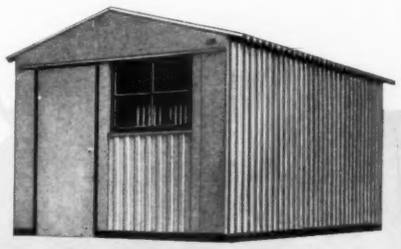
A fact-filled 4-page folder tells how the new LIMA Roadpacker will help you make more paving profits. Write for your copy today.

LIMA SHOVELS • CRANES DRAGLINES • PULLSHOVELS — **BALDWIN-LIMA-HAMILTON** Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

For more facts, use Reader-Reply Card opposite page 18 and circle No. 330

. . . for tool storage or office



. . . for garaging, warehousing or manufacturing

USF Engineered
METAL BUILDINGS

HANDY HUTS

All steel, prefabricated, 10'3" wide, 12' or longer, 7'6" to eaves. Erects quickly with "Clip-and-Wedge" method of assembly; easily dismantled for relocation or can be dragged intact on skids. Many optional features and accessories available.

USF Handy Hut folder tells how to design your own building.

UTILITY BUILDINGS

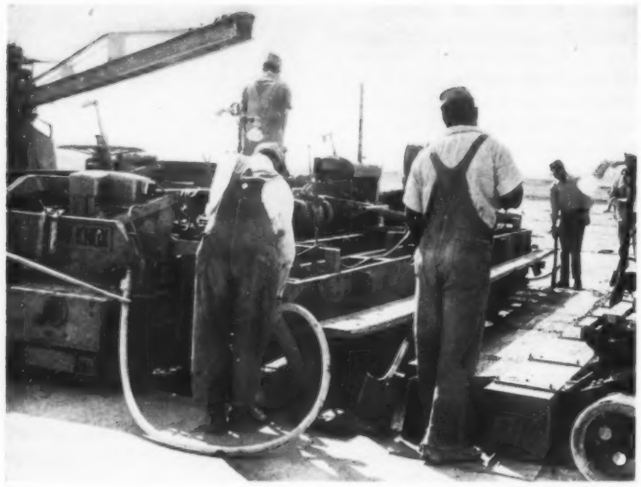
Rigid-frame, 30'—40' and 50' span buildings in any length in 20' multiples. Patented "Clip-and-Wedge" assembly method provides low-cost, trouble-free erection. Exclusive USF corrugation design insures weatherseal joints. Choose from wide selection of door and window arrangements.

This new Steel Building bulletin explains USF design advantages in detail.

United Steel Fabricators, Inc. — WOOSTER, OHIO

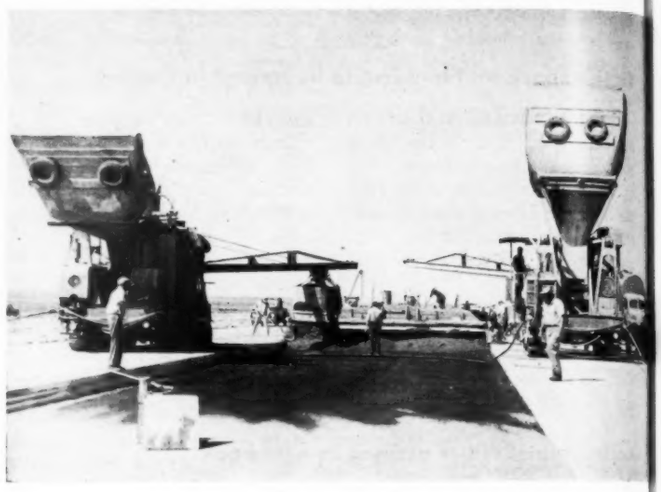
PRODUCTS
Hollow Metal Doors • Prefabricated Metal Buildings • Window Wells • Highway Guard Rail • Bridge Flooring • Steel Forms for Concrete Bridge Floors • Corrugated Metal Pipe • Sectional Plate Pipe and Pipe Arches

For more facts, use Reader-Reply Card opposite page 18 and circle No. 331



Just behind the Blaw-Knox spreader workmen use internal-type vibrators to consolidate concrete at the edges of the slab. Curing and joint sawing were done under different subcontracts.

With rubber pads bolted to individual tracks to protect the new slabs, these Koehring 34-E Twinbatch pavers dump concrete to a 25-foot-wide lane for one of the 1,000-foot portland-cement sections at each end of the runway.



Concrete, hot-mix reconstruction hurried to keep airbase operative

Precise grade lines make new bituminous pavement merge with old; subcontract work helps keep big job on tight schedule

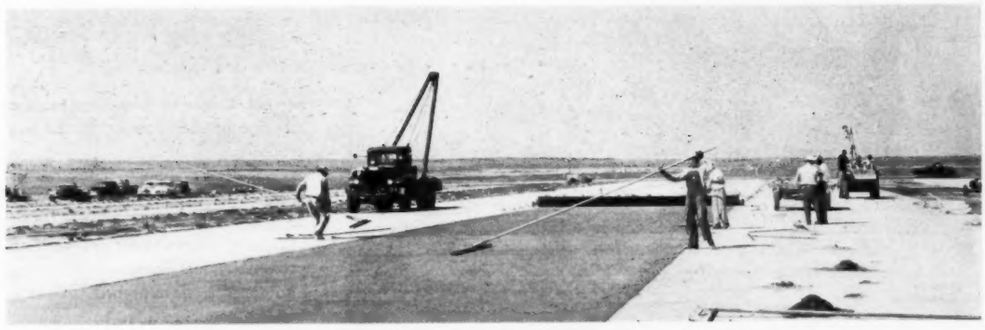
Rebuilding a runway so that new paving merged with the old with perfect grade lines was added to routine problems of high compaction and precise grading during reconstruction work and new paving at Larson Air Force Base near Moses Lake, Wash. But the job was done—despite the fact that the contractor also had to meet what was regarded as an "impossible" paving schedule.

This reconstruction work at Larson shows how progress in aeronautics has influenced the engineering and construction of airfields. The base was built under a crash construction schedule in 1942, but in the past few years, modern aircraft have so overloaded the old runway that extensive pavement cracking took place and made maintenance costs exorbitant. And the old connecting taxiway system, together with the airport lighting system, had fallen behind modern standards with the passage of time.

Corrective work started after the Air Force requested the Walla Walla District Office of the U. S. Army Corps of Engineers to bring the main 10,000-foot NNW-SSE runway to jet age standards. A $2 million contract, let to the Spokane, Wash., construction firm of McAtee & Heathe, covered grading, the ripping out of 1,000 feet of old concrete at each end of the existing runway, the preparation and installation of subbase under the new pavement, the removal of the north-south and east-west taxiways.

A truck waits to be loaded at the Barber-Greene Model 848 plant producing all the asphaltic-concrete paving material required for the runway, for patching, and for the 4-inch overlay on taxiways.

Leveling, binder, and surface courses of hot-mix paving are put down by this Barber-Greene paver, one of two on the job. The Galion 10-ton roller is one of several working to make the surface course come out to exact grade.



Finishing touches are given to the portland-cement concrete slab by workmen with long-handled floats just before wet burlap is placed for a seven-day cure.

the paving of the taxiways with portland-cement concrete, the repair and patching of the old runway surface, a general asphaltic-concrete overlay with a minimum thickness of 4 inches over the remaining 8,000-foot runway and east and west taxiways, and extensive shouldering work along taxiways and runways. The installation of a complete lighting system for the field was also included in this contract.

Organize for fast job

Pressure from the Air Force—which wanted the field back in use in the shortest possible time—made it necessary for the contractor to have all this work completed in 8½ months. This schedule was even tighter, for change orders for extensive additions to the original contract were made as the job proceeded.

In view of these factors, McAtee & Heathe subcontracted portions of the work to specialty firms. A heavy grading and equipment fleet and rock-crushing machinery belonging to F. R. Hewett Co., Spokane, was used for grading and subbase work. A subcontract to clean the joints and surface of the old runway slab was also awarded. The 1,000-foot, 11-inch portland-cement concrete paving at each end of the runway was let to the Seattle firm of N. Fiorito Co., Inc. The installation of the electrical system was farmed out to two firms: one did excavation for the many structures and conduit lines, and the other—Industrial Electric Co., Seattle—did the actual wiring and installation of lights. Various structures included in the contract were also subcontracted. Cyclone Fence Division of American Steel & Wire Co. got the subcontract for fencing around transformer stations, and another subcontract covered paint striping. And all private engineering necessary for the administration of the contract was let to E. B. Steele, an individual specializing in construction engineering.

Grading difficult

The biggest grading difficulty was caused by the large rounded boulders on the glacial plain where Larson AFB is located. While it was difficult to build an accurate subgrade with such large stones in the earth, it was even more difficult to compact the glacial material and blade it to grade.

Hewett's basic spread included four Caterpillar DW21's, four D8 tractors —one equipped with a Fleco rock rake—a Bros 50-ton pneumatic compactor, a Hyster grid roller, a 10-ton steel-wheel roller for finish compaction, and several truck-mounted water tanks. Some water was obtained from the base supply, but large quantities had to be hauled to the field

(Continued on next page)

For more facts, circle No. 332→

TORQUE CONVERTER DRIVE . . . matches power and speed to job requirements automatically . . . cushions entire power train

1,000-HOUR LUBRICATION INTERVALS for truck wheels . . . eliminate daily greasing . . . convert service time to profit time

ONE-PIECE STEERING CLUTCH AND FINAL DRIVE HOUSING . . . insures perfect alignment, low maintenance, long life

UNIT CONSTRUCTION . . . makes major service simple, fast

ALL-STEEL BOX-A MAIN FRAME . . . provides full-length protection

All pioneered and proved by Allis-Chalmers . . . five of dozens of basic advantages that can help you bid lower . . . get more jobs . . . make a profit when you're through. Now is the time to have them working for you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

The high densities required in the subgrade are achieved by this Bros 50-ton pneumatic compactor. A grid roller broke extremely rocky material down into the lift before the Bros rig went to work. Grading was also handled under a subcontract.

(Continued from preceding page)

so that 95 per cent density requirements could be obtained in the subgrade.

On this long-haul grading, pusher tractors were used behind the DW21's to help them obtain heaping loads.

Lifts of subgrade fill averaged approximately six inches uncompacted, and densities have been developed by two kinds of rolling. In extremely rocky material the Hyster grid roller tended to mash boulders down into the body of each lift. On finer material, and also on the surface of lifts rolled by the Hyster unit, a 50-ton pneumatic-tire compactor was used.

Tough job cleaning pavement

Cleaning jet-fuel-resistant joint-filler out of the many cracks in the old portland-cement concrete gave the Charles R. Watts Co. "a bearcat of a time" according to one official. If the joint-filler was removed during the hot part of the day, it sagged down and bonded to the adjacent concrete. Then the material had to be removed again and the stained concrete buffed clean. Because of this, joint-cleaning was done at night or in the cooler hours of the late evening or early morning.

The job of ripping out the old joint-filler material was done for the Watts firm by two Le Roi Tractairs equipped with hydraulically controlled plows and points. These plow points reached down about one inch into the cracks and picked up the bulk of the material. This was less than half of the job. Joint-filler material adhering to the sides of the concrete was removed in a slow, laborious process by four Tennant joint groovers, a Tennant power broom, and a small Gibson farm tractor. Two water trucks, several pickups, a crew of eight to nine men, and several Onan 3,000-watt lighting plants for night operation were also used on this most costly and tedious job of the project.

Even after the joints had been cleaned, they proved troublesome. When pavers started laying a binder course of asphaltic concrete, the material tended to bridge over the joints. When rolling started, the material shoved ahead of the roller. This difficulty was not eliminated completely until laborers tamped the plant-mix into the grooves ahead of the laydown machine.

Fast concrete schedule

The Fiorito Co., handling the paving of the 1,000-foot portland-cement concrete strips at each end of the taxiway, had a daily schedule calling for a 25-foot-wide, 11-inch-thick strip to be put down the entire 1,000-foot length of the strip.

This concrete rests on a 4-inch base course of crushed gravel, 1½ inches and smaller in size, compacted to a density of 100 per cent. This material was produced by the crushing plant F. R. Hewett Co. set up near one end of the main runway. The plant consisted of a Cedarapids 18 × 36 jaw crusher driven by a Caterpillar diesel, a double-deck set of Cedarapids 4 × 10 - foot vibrating screens, a 3-foot Symons standard cone crusher, another double-deck Cedarapids 4 × 12 - foot vibrating screen, a 24 × 54 roll crusher and a 35-ton surge bin that loaded trucks.

Crusher and screening flexibility in this setup made it possible for base-course material to be turned out at high speed. The plant also turned out aggregates for the asphaltic concrete, often in three sizes—⅜ to ¾-

Are You Ready to Get Your Share of the $325,000,000* Swimming Pool Construction Market?

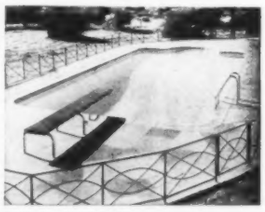
*Survey by Swimming Pool Age

AIRPLACO® Concrete Gunning Equipment Makes Pool Construction

FASTER • EASIER • MORE PROFITABLE

As the swimming pool becomes an increasingly familiar part of America's way of living, it opens up a tremendous new profit opportunity for you.

This opportunity can be even more profitable if you use AIRPLACO concrete gunning equipment for your pool construction jobs. You get the job done faster, easier, better and at a greater profit to you.



AIRPLACO PORTABLE RIG

The AIRPLACO rig consists of a job-proved BONDACTOR® or NUCRETOR,® the automatic proportioning, continuous mixing, elevating and screening MIX-ELVATOR, and the time-saving SAND-LOADER. Makes any concrete job easier, more profitable.

AIRPLACO concrete gunning equipment is available in a wide range of sizes to meet your production and job requirements from ½ to 7 cubic yards of aggregate per hour, and using air compressors with 75 to 600 CFM capacity.

FREE CATALOG

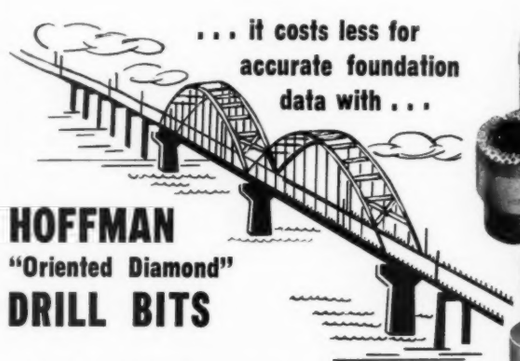
WRITE TODAY FOR FREE CATALOG . . . that will explain all the many benefits and specifications of AIRPLACO concrete gunning equipment or see your AIRPLACO distributor.

AIRPLACO® AIR PLACEMENT EQUIPMENT CO.

1007 WEST 24TH ST. KANSAS CITY 8, MO.

MANUFACTURERS OF ADVANCED DESIGN CONCRETE GUNNING, MIXING, GROUTING AND SANDBLASTING EQUIPMENT

For more facts, use Reader-Reply Card opposite page 18 and circle No. 333



. . . it costs less for accurate foundation data with . . .

HOFFMAN "Oriented Diamond" DRILL BITS

Foundation exploration costs less with Hoffman Bits because they eliminate guessing about formation structures for quick, accurate job estimates. Exposing only the sharp, hard diamond edges to the work, Hoffman Bits cut rather than scrape. They produce clean, smooth cores at lower footage costs — use less power — last longer. Designed and tested for each application. Hoffman Bits are the answer where core drilling accuracy and economy are important.

Write today for catalogue and prices — FREE

HOFFMAN BROTHERS DRILLING COMPANY

BOX 426 PUNXSUTAWNEY, PA.

SINCE 1902

For more facts, use Reader-Reply Card opposite page 18 and circle No. 334

inch, ⅜ to ¼-inch, and minus No. 4 —all at the same time.

As the base-course material was placed, then rolled by both pneumatic and steel-wheel equipment, the surface was finished to a tolerance of $^{3}/_{8}$-inch in 10 feet.

Paving started with crews putting down alternate lanes first, then shifting equipment to the finished slabs to pave the remaining lanes. In the paving lineup were two Koehring 34-E Twinbatch pavers that worked from opposite sides of the lane. When these pavers moved onto the completed concrete slabs to pave the lanes that had been omitted, special rubber pads were bolted to the individual track pads of the rigs to prevent the new slabs from being damaged. This did away with the need to place tires, belting, or any other kind of padding over the concrete.

The concrete batches were turned out by a Noble semiautomatic plant that had storage facilities for sand, coarse aggregate, and cement. Aggregates and sand for the mix were supplied to the plant by Columbia Sand & Gravel Co.

As the mix was brought to the runway, water was added to it from the trailer tanks towed along by the Koehring Twinbatch pavers. As concrete was dumped to the grade, it was struck off by a Blaw-Knox spreader, then finished by a Jaeger-Lakewood machine and a Koehring longitudinal float. Some work was done with a long handled wood float before the final surface was finished with a pulled belt.

After a wet burlap cure of seven days, the slab was stripped of the forms and the sides of the slab were sprayed with Hunt Process Clear curing solution.

Contraction joints were sawed on 25-foot centers in the slab within 24 hours by several ConSawMatic machines. The 75-foot interval joints were made as soon as the concrete had hardened enough so that no spalling would result. A short time later, the alternate joints were sawed.

Exacting hot-mix paving

Several things complicated the asphaltic-concrete paving job. Specifications did not simply call for a uniform overlay, but for an overlay to definite projected grade lines. Practically no tolerance was allowed. Also, plans were marked in tenths and hundredths of a foot, while paving crews are used to work with inches and fractions of an inch.

As a result, screed men had to gage changing thicknesses in the pavement rapidly—particularly in the binder and leveling courses—to bring the compacted lifts out to project tolerance and elevation.

The old concrete surface was prepared for the asphaltic-concrete overlay by a tack coat of RS-1 emulsion. This was also used to tack the lifts of asphaltic concrete together. MC-1 was used as a prime coating for gravel base courses.

The paving material was turned out by a Barber-Greene Model 848 continuous-mix unit that had individual components run by electric motors. A power line was run into the job for the operation of the plant and some of Hewett's rock-crushing equipment. The plant had storage for 20,000 gallons of 100 to 120-penetration asphalt and 10,000 gallons of fuel. A five-pile separation of materials provided gradation control. The materials, 1 to ¾-inch, ¾ to ⅜-inch, ⅜ to ¼-inch, ¼-inch-minus, and sand, were stacked next to a long conveyor belt that fed the cold elevator of the plant.

Syntron vibrating feeders tapped each pile and controlled the amounts of each material entering the plant drier. After being heated and dried, the materials were separated into four bins, then mixed in the pugmill.

Two Barber-Greene finishers laid the material and a large number of rollers compacted the lifts. Among these were a Huber 10-ton 3-wheel unit, two Galion 10-ton rigs, two Austin-Western tandems, and a Buffalo-Springfield 20-ton roller purchased specially for this job. A Bros self-propelled pneumatic roller was used on the surface course. At least four rollers worked behind the pavers continuously.

Three lifts were generally placed: a leveling course that covered the old cracked concrete pavement, a binder course that trued up the pavement, and a surface course that brought the mat out to final grade. As courses were put down, surveyors ran levels and set steel pins so that the paving operation was finished to close tolerance.

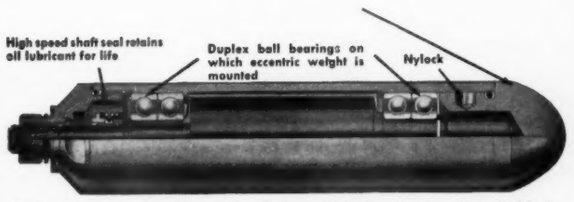
Paving operations, which continued six days a week, 10 hours a day, and nine hours on Sunday, followed a definite procedure. In stage 1, the north-south taxiway, two stubs near the intersection of the two main runways, and a taxiway near the new prestressed-concrete Boeing hangar were rebuilt and paved.

Only seven days were allowed for stage 2 construction, which called for

In Concrete Vibrators, it's the WALLOP that counts!

"Wallop", which is what many contractors call amplitude, is what it takes to vibrate a stiff mix — quickly and thoroughly. Recent tests prove that the efficiency of vibration increases in proportion to the amplitude. Therefore, Stow Manufacturing Co., Binghamton, N. Y., has developed a lightweight, rugged vibrator head that packs a *terrific* wallop.

Rugged new Stow 2 HP BU electric vibrator. It has Underwriter's Laboratories listing for 50/60 cycle AC operation.



Take a look at this vibrator head. It is 10 inches long, and available in diameters of 1⅝, 2 and 2½ inches, capable of 9000 VPM. Vibrators are achieved by use of an eccentric weight mounted in special high speed duplex ball bearings at each end. The outside of the head is case hardened, for extra long wear, and it has a replaceable tool steel tip. Stow estimates that these two improvements alone will double the life of the heads.

Big 5.6 HP Stow AG vibrator.

Construction men report that they like the light weight, the long life, the low replacement cost, and the terrific wallop of these heads. Weight of the 1⅝" head is about 5 lbs.; the 2" head about 7½ lbs.; the 2½" head, about 9 lbs. The cost of this head is less than ⅓ the cost of expensive "motor-built-in" type heads.

The 1⅝" head is also available with a hard rubber tip for use where plywood forms are being used.

For more information about the complete line of STOW concrete electric and gasoline vibrators, vibrating screeds and rotary trowels, contact your STOW distributor by looking in the yellow section of your telephone directory under "Concrete Vibrators" or write for STOW Catalog 560.

STOW

STOW MANUFACTURING CO., 40 Shear Street, Binghamton, New York

For more facts, use Reader-Reply Card opposite page 18 and circle No. 336

"FASTER AND CHEAPER DIGGING EVEN IN WET, STICKY SOIL"

Says R. K. Nichols
Los Gatos Construction Co.
Los Gatos, California

"In laying telephone cable for Pacific Tel. & Tel. Co. in Salinas, Calif., we were able to start the job early, even in extremely wet and sticky mud . . . thanks to our 524T Pow-R-Ditcher. It dug very well at 9 feet per minute under tough conditions."

POW-R-DITCHER DIGS 1'-15' PER MINUTE — 8" to 24" WIDE

An ideal, low cost, rugged ditcher for contractors, municipalities, utility companies, etc. One-man operation. 2-way side conveyor. Easy to transport. It's the BIG ditcher with the low price. Smaller models also available.

Some excellent sales territory available

VERMEER MANUFACTURING CO. PELLA, IOWA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 335

the paving of the intersection between two runways. Though a number of contractors doubted that it was possible to complete this asphalt paving in time, because of the amount of patching and joint-cleaning that had to be done beforehand, project manager Jim Burton finished the assignment with two hours to spare, and made it possible for the alternate runway to be used during the time the main runway was being completed.

Stage 3 work saw the west taxiway completed, and stage 4 construction included the asphalt overlay pavement for the main runway and the construction of the two 1,000-foot portland-cement concrete sections at either end.

THE END

Expand line of engines with two new power units

■ Two new power units have been added to the line of engines manufactured by the Construction Equipment Division of the International Harvester Co. The new 4-cylinder engines designated the U-175 and U-281, are available with equipment for operation on gasoline, LPG, natural gas, distillate, or kerosene.

The U-175 develops 50 horsepower at 2,000 rpm on gasoline, with a compression ratio of 6.8 to 1. Its displacement is 175 cubic inches. The U-281 produces 67.5 horsepower at 1,800 rpm on gasoline and has a compression ratio of 6.6 to 1. Its displacement is 281 cubic inches.

For further information write to the International Harvester Co., Construction Equipment Divsion, 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 57.

Film on traffic paints

The best methods of selecting and applying traffic paints are shown in a 16mm color-sound film, "Highway Life Lines," which the Hercules Powder Co., Wilmington, Del., has made available for showing.

Methods of evaluating traffic paints, factors influencing paint performance, and various methods of painting are shown in this movie.

Prints of the film may be obtained from the Advertising Department, Hercules Powder Co., Wilmington 99, Del.

The versatile Mobile B-52 Pacemaker handles auger boring, core and percussion drilling, and soil sampling tasks with equal efficiency.

Mobile rotary drill handles several jobs

■ A new high-powered mobile rotary drill that handles auger boring, core and percussion drilling, and soil sampling tasks is announced by Mobile Drilling, Inc. The B-52 Pacemaker can generate up to 5 tons push or pull ram force. It has a twin hydraulic feed and handles 6-foot sectional augers in 3 to 24-inch diameters.

In addition to its versatility, the Pacemaker features the mobile "hollow stem" auger that is said to permit undisturbed soil sampling without withdrawing the auger from the hole. Samples can be taken without interrupting boring operations. Coring may also be continued through the hollow stem of the auger when rock has been reached.

The drill has a one-man control panel, an off-the-hole movable hydraulic base that cuts drilling and withdrawal time, a 22-foot tower that jackknifes to traveling position, and a spindle-type drive tube that permits easy accessibility to both auger couplings and A or N rod chucks. It bores up to 150 feet in unconsolidated materials, up to 600 feet with N rods, and up to 1,000 feet with A rods.

For further information write to Mobile Drilling, Inc., 960 N. Pennsylvania St., Indianapolis, Ind., or use the Request Card at page 18. Circle No. 68.

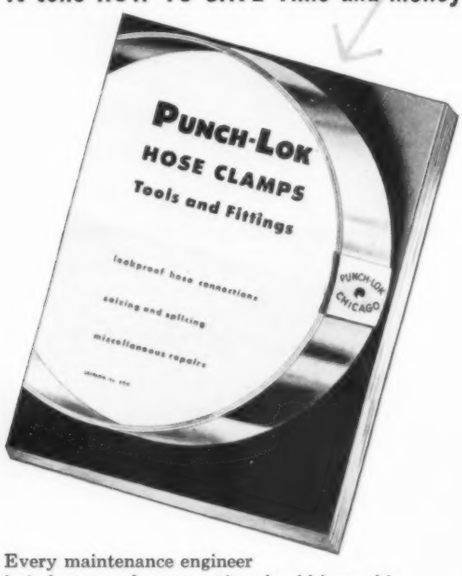
Safety head protection

■ A cartoon booklet entitled "Attempted Murder" explains the importance of safety head protection and describes the maintenance required for hard hats. It is available from the E. D. Bullard Co. By means of case histories from the files of "Hard-Boiled Harry," the booklet demonstrates the importance of wearing safety hats and the importance of wearing them correctly.

To obtain this booklet write to the E. D. Bullard Co., 2680 Bridgeway Blvd., Sausalito, Calif., or use the Request Card at page 18. Circle No. 5.

Write for this FREE New 12-page Data Book

It tells HOW TO SAVE Time and Money

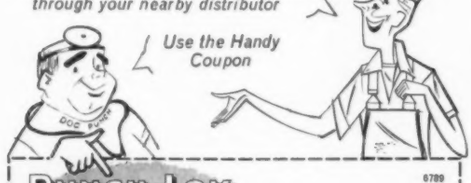


Every maintenance engineer in industry and construction should have this complete compilation of data on the application and use of Punch-Lok Hose Clamps . . . the perfect clamp for . . .

Pneumatic Tool Hose **Suction and Discharge Hose**
Welding Hose **Seizing Wire Rope Ends**
Mending Split Posts, Beams, and Planks
Splicing Welding Cable **Hundreds of Other Jobs**

Punch-Lok Hose Clamps are available through your nearby distributor

Use the Handy Coupon



PUNCH-LOK Company

6789

Dept. J, 321 N. Justine St.
Chicago 7, Illinois

Please send me a copy of your new 12-page data book.

Individual_____ Title_____

Company_____

Street_____

City_____ Zone___ State_____

For more facts, use coupon or circle No. 337

The modern, effective way to handle cement for rear discharge!

OMAHA STANDARD *Air-Slide* CEMENT TRAILER

incorporates the Fuller Air Slide Principle

Will cleanly evacuate 100 barrels of cement in 10 minutes. No pounding or vibrating necessary. Air pressure gives complete rate of evacuation control. Low height and perfect load distribution. Fast loading through a minimum of 3 roof hatches. Hopper bottom gravity flow models also available.

Prices and weights quoted on request.

Distributorships available in certain areas

"Custom-Made Material Trailers—for ANY Commodity"

OMAHA STANDARD
2401 W. Broadway, Council Bluffs, Iowa

For more facts, circle No. 338

NO CONCRETE PIT!
Easiest to MOVE!

THURMAN

PORTABLE TRUCK SCALES

Engineered for rugged use in the field. Low initial cost, no maintenance. Can be used as PITLESS SCALE saves on pit costs.

CAPACITIES: 20 to 52 tons. DECK LENGTHS 18 to 43 ft.

OTHER THURMAN SCALES: Pit • Warehouse • Industrial • Liquid Weighing • Wheelbarrow • Batching • Automatic

Precision Scales since 1918

THURMAN SCALE COMPANY

156 N. 5th St. Dept. CO-1 Columbus, Ohio

For more facts, circle No. 339

Hydraulic pumps, motors

■ Hydreco oil hydraulic pumps and fluid motors are the subjects of a brochure from the Kalamazoo Division of the New York Air Brake Co. The pumps, operating up to 1,500 psi, are four-bolt gear-type units with capacities of from 3 to 150 gpm. The motors are also of the four-bolt gear type and are designed for a maximum of 1,000 psi. Both pumps and motors may be flange or foot-mounted.

Photographs and cutaway drawings illustrate the construction and design features of the units. The pressure-balanced wear plate incorporated into the units is fully explained. Also detailed is the four-bolt design which places all four assembly bolts within the area of greatest internal pressure, resulting in reduced internal distortion and reduced wear on internal parts.

To obtain Bulletin 139C write to Kalamazoo Division, New York Air Brake Co., 1827 Reed St., Kalamazoo 24, Mich., or use the Request Card at page 18. Circle No. 35.

AGC plans new home

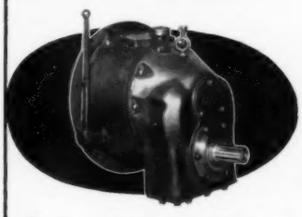
A new home is being planned for the Associated General Contractors of America. To be located in Washington, D. C., the three-story building will have a buff Indiana limestone exterior with harmonizing trim. The institutional design is in keeping with outstanding buildings nearby. The architectural firm of Chatelain, Gauger & Nolan, Washington, D. C., prepared the working drawings.

The ground for the new building is scheduled to be broken during the association's 38th annual convention in Washington next month, and the building is expected to be ready for use in the summer of 1958.

WORKMEN LOWER A STRAPPED COLUMN FORM into place over reinforcing rods during the construction of the six-story Bronson Hospital Nurses' Home in Kalamazoo, Mich. Seth E. Giem & Associates is the contractor on the $1,343,000 job, which is expected to be completed this month. Strapping manufactured by the Signode Steel Strapping Co. is being used throughout the job in forming 1 × 1 × 8-foot and 2 × 2 × 12-foot columns. According to the company, forms can be assembled and removed quicker when strapping, rather than conventional clamps, are employed. Also, the forms can be trued up much easier. Generally, all that is required are a few sharp raps with a mallet. According to the company, use of the strapping will save a total of more than 300 man-hours on the job. For more details on the strapping write to the **Signode Steel Strapping Co.**, 2600 N. Western Ave., Chicago 47, Ill., or use the Request Card at page 18. Circle No. 270.

S-N

REDUCTION GEARS FOR HEAVY-DUTY EQUIPMENT



For use on Gasoline and Diesel engines . . . 7 models . . . cut-off clutch . . . 40 to 755 HP range . . . gear ratios 1:5.1 to 4:1 . . . up to 3300 lbs/ft engine torque Write for complete information.

SNOW-NABSTEDT

Transmission Engineers

FOR HALF A CENTURY

MAKERS OF JOE'S GEARS

THE SNOW-NABSTEDT GEAR CORP., HAMDEN, CONN.

For more facts, circle No. 340

GALION

ROLL-O-MATIC TORQUE CONVERTER

TANDEM ROLLERS

Give You All.... These Advantages

- Torque Converter Drive. No gear shifting, no master clutch.
- Faster work cycles. More work accomplished. Smoother operation.
- Shock loads are eliminated.
- No engine stalling or lugging.
- Velvet-smooth travel reverse at the end of each pass.
- Compared to conventional gear-shift drive, ROLL-O-MATIC Drive saves fuel and greatly increases life of engine, gears, shafts, bearings, forward and reverse clutches.
- Rolling speeds .8 to 5.5 mph.
- Galion straight line spur gear final drive combines gradual gear reduction, low ratios, anti-friction bearings, and alloy steel gears to assure constant alignment, less wear and maintenance.
- Dual operating controls.
- Hydraulic steering.
- Compact design — unobstructed visibility.
- Variable weight.

Write for complete details TODAY

OPERATORS APPRECIATE GALION ROLL-O-MATIC DRIVE

They can do more and better work with less physical effort. There is no gear shift mechanism — no master clutch to operate.
When the governor lever is moved to a selected rolling speed, the engine power is applied and regulated AUTOMATICALLY —

GALION 50th ANNIVERSARY 1907

* Utilizing a General Motors —Allison Torque Converter

Two-Speed Transmission Available.

ESTABLISHED GALION 1907

MOTOR GRADERS · ROLLERS

TRENCH ROLLERS · PORTABLE ROLLERS · 3-WHEEL ROLLERS · TANDEM ROLLERS · MOTOR GRADERS

THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.
Cable address: GALIONIRON, Galion, Ohio

For more facts, use Reader-Reply Card opposite page 18 and circle No. 341

Construction camera

Snaking across the concrete of the Barnhart Island Powerhouse draft tube during concrete forming on the St. Lawrence power project is Goodrich Type 50 hose used for water, cement grouting, and suction purposes. It is holding up well, even though it has to be dragged over abrasive concrete.

The last girder on a Jacksonville Expressway overpass in Florida is set in place by a Manitowoc 3000 Speedcrane with a 70-foot boom. This is one of eight structures in the contract, held by Duval Engineering & Contracting Co., Jacksonville, for a large interchange section.

Survey shows increase in welding for bridges

Lincoln Arc Welding Foundation recently conducted a correspondence survey with state highway departments to discover to what extent welded design is being used in bridge construction.

The questionnaire asked to what extent welding was being used in such secondary members as bracing, bearings, expansion devices, and shear attachments; cover plates on wide flange beams; fabrication of plate girders; and field splices of girders. Of the 46 states responding, all used welding on secondary members, 35 used welded cover plates, and 22 used an increasing number of welded plate girders.

HRB publishes bulletin

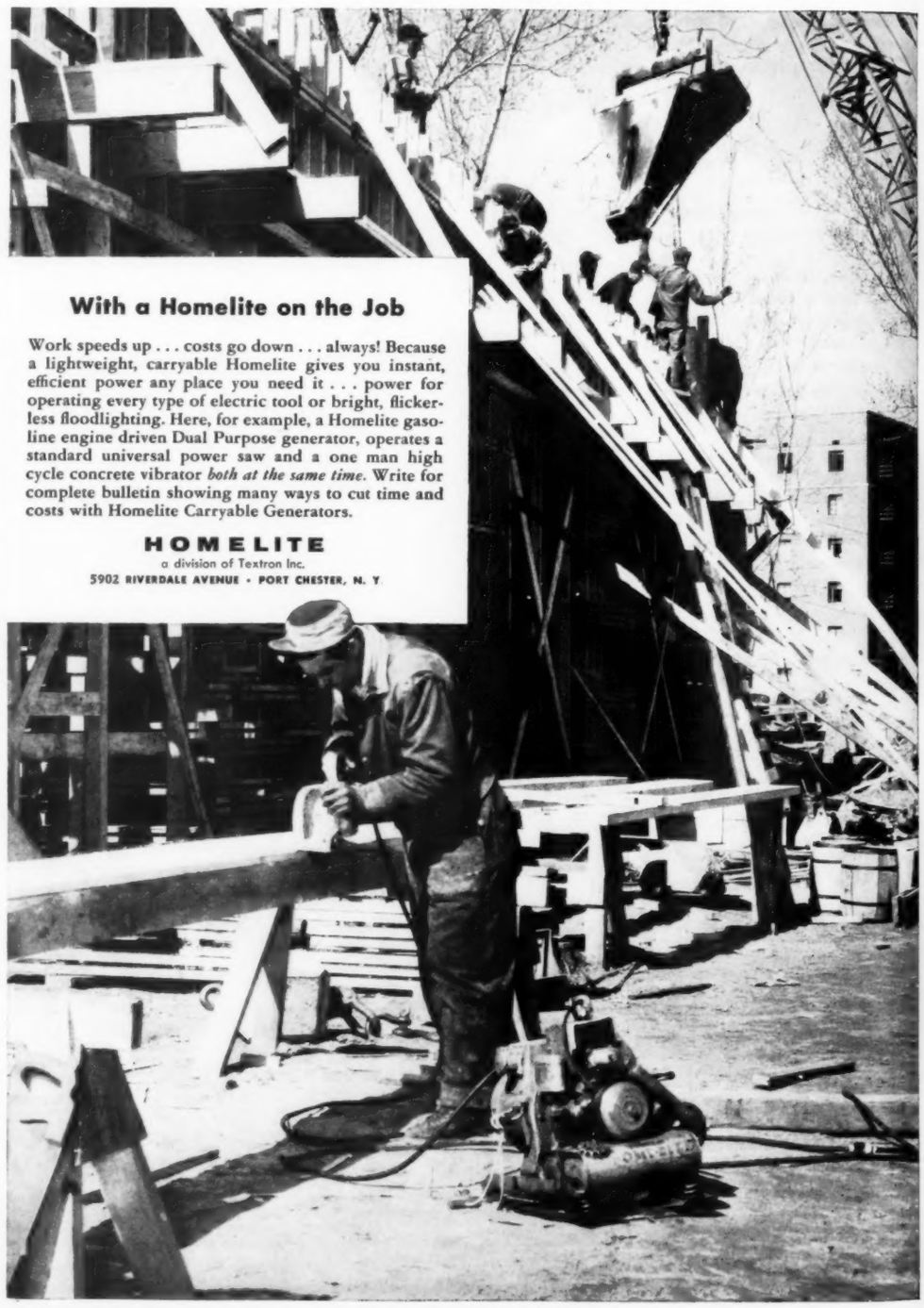
Four papers presented at the 35th annual meeting of the Highway Research Board have been compiled into bulletin 131, obtainable from the HRB, 2101 Constitution Ave., Washington, D. C.

The papers, dealing with widening and resurfacing of bituminous concrete, include: "Wire Mesh Reinforcement in Bituminous Resurfacing"; "Pavement Widening and Resurfacing in Idaho"; "Highway Rehabilitation by Resurfacing"; and "Progress of Reflection Cracking in Bituminous Concrete Resurfacing".

Typical lumber designs

■ Nearly 300 designs of wood structures, ranging from basic types of trussed rafters and heavy wood roof trusses to highway structures, towers, and buildings, are illustrated and listed in the 1957 edition of "Typical Lumber Designs," which is available from the Timber Engineering Co., a research affiliate of the National Lumber Manufacturers Association. The new edition has been condensed to a convenient form for ready reference by designers.

To obtain this booklet write to Timber Engineering Co., 1319 Eighteenth St., N. W., Washington 6, D. C., or use the Request Card that is bound in at page 18. Circle No. 16.



With a Homelite on the Job

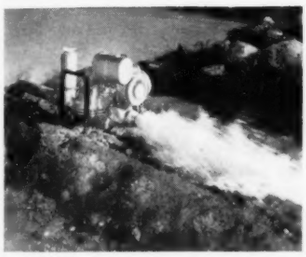
Work speeds up . . . costs go down . . . always! Because a lightweight, carryable Homelite gives you instant, efficient power any place you need it . . . power for operating every type of electric tool or bright, flickerless floodlighting. Here, for example, a Homelite gasoline engine driven Dual Purpose generator, operates a standard universal power saw and a one man high cycle concrete vibrator *both at the same time*. Write for complete bulletin showing many ways to cut time and costs with Homelite Carryable Generators.

HOMELITE
a division of Textron Inc.
5902 RIVERDALE AVENUE • PORT CHESTER, N. Y.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 342

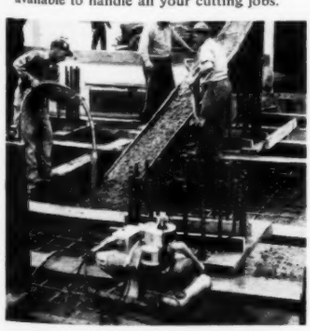
Fills built up during the widening of U. S. 58 just east of Danville, Va., are rolled by a Buffalo-Springfield K-45 Kompactor. This 5-mile job will provide an additional two lanes for the existing highway, making it a four-lane divided road. The contractor, A. B. Burton & Co., Inc., Lynchburg, Va., moves excavated material from cuts to fills with a fleet of Caterpillar DW21 scrapers, one of which is shown above depositing material on the roadway. The Buffalo-Springfield Kompactor, background, is starting to compact the lift. Trees are left standing in the median strip under a new safety policy of the State Highway Department.

Full Line of Carryable Construction Equipment Now Offered by Homelite



Carryable Diaphragm Pump . . . This self-priming, 120 pound diaphragm pump will handle water in the thickest sand, muck, or mud. Capacity: 5,000 g.p.h. Size: 3". Complete line of centrifugal pumps are also available in sizes from 1½" to 3".

Chain Saws For Every Job . . . Now you can choose from a full line of lightweight, powerful Homelite chain saws. From 3½ to 7 horsepower . . . 19 to 29 pounds. Brush cutting and clearing attachments are available to handle all your cutting jobs.



One-Man Electric Vibrator . . . It takes only one man to place concrete with powerful, Homelite high-cycle or universal electric concrete vibrators. Carryable Homelite generator provides power for high-cycle vibrators *and* 110 volt DC for all universal vibrators, tools and floodlights.

HOMELITE

a division of Textron Inc.

PORT CHESTER, NEW YORK

For more facts, circle No. 343

James T. Jenkins named editor of ARBA magazine

James T. Jenkins, Jr., has been named editor of the American Road Builders' Association magazine, *The Road Builders' News*.

Jenkins' first assignment is to enlarge and revitalize the publication as part of a long-range program of intensified services to ARBA membership.

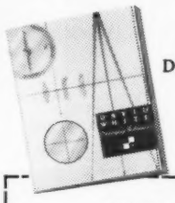
Jenkins is a former vice president of advertising and information for Frigidinner, Inc., frozen food manufacturer of Philadelphia, Pa. His background covers feature writing for the Richmond (Va.) Times Dispatch, editing consumer and general interest magazines, and several years' experience as a free lance writer for national magazines and newspapers.

Robert L. Smith, editor of the ARBA magazine for the past 3½ years, will devote full time to public relations and special activities for the organization.

Just out!

NEW David White CATALOG

First really new catalog in the instrument field. Contains complete, up-to-the-minute facts about the entire David White line of precision instruments . . . as well as news about some brand new David White products. Fill out the coupon—and mail today.



the sight is right with a DAVID WHITE

E

David White Instrument Company
2501 N. 19th Street
Milwaukee 5, Wisconsin

Please send the 1957 David White Instrument Catalog to:

Name _____

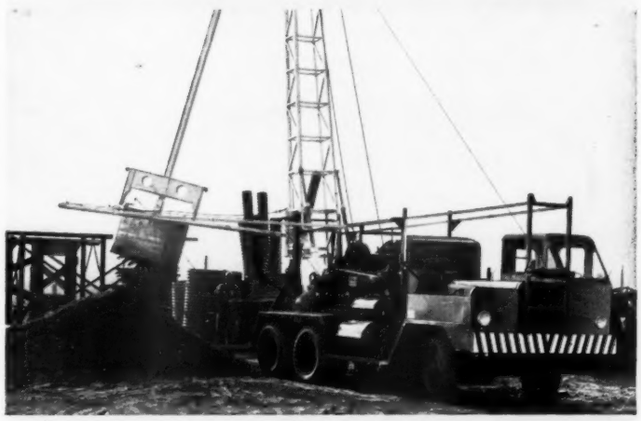
Firm Name _____

Street Address _____

City _____ State _____

For more facts, use coupon or circle No. 344

eliminate manual digging



IN EXCAVATING FOR...

CAISSON PIERS • CONCRETE PILES • TANK BURIAL • CESSPOOLS

SOIL TESTS • MINING • WATER WELLS • OIL WELLS • MANHOLES

THE BUCKET ROTATES on a CALWELD Earth Drill and bores down into the earth. When the bucket is full it is pulled up and dumped. That's how easy it is to make a clean excavation of any size from 1 to 10 feet in diameter and as deep as 200 feet.

The excavation goes fast, too, because it removes up to 1.4 yards per pass; can dig a hole 45 feet deep in less than one hour. Thus, the CALWELD Earth Drill eliminates slow, costly hand labor and danger to workers.

There is a variety of interchangeable buckets available for digging in all types of subsoil formations.

Hundreds of CALWELDS are being used by contractors throughout the World. Investigate the many, money-saving advantages of this high-speed excavator. Write for catalog. CALWELD, INC., 7222 E. Slauson Avenue, Los Angeles, Calif.

DIGS 12" TO 120" HOLES
AS DEEP AS 200 FEET
MOBILE • MANEUVERABLE

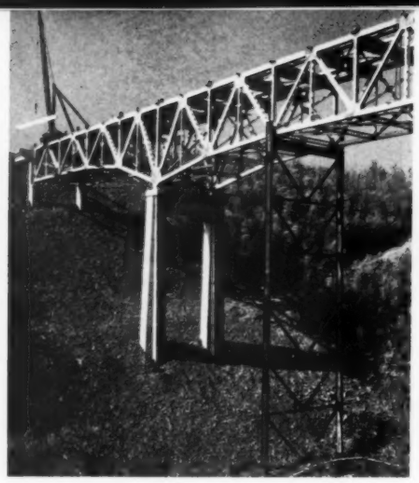
CALWELD INCORPORATED

CALWELD
BUCKET TYPE
EARTH DRILLS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 345

Construction camera

Earthmoving for a pipeline right-of-way at Black Lake, Quebec, Canada, is handled by a Marion 93 M dragline powered by a Cummins 300-hp diesel torque converter unit.



A 150-foot-high falsework bent erected by Bethlehem Steel Co. supports a span of the Hawk Falls Bridge located on the Pennsylvania Turnpike northeast extension.

Construction materials are swung to workmen on the roof of Veterans Memorial Hall, Columbus, Ohio, by a Bucyrus-Erie 51-B crane with a special jib extension.

NEW 360 HALF-YARD HOPTO

DIGGER • SHOVEL • CRANE

360° SWING! FAST CYCLING!

180° BUCKET TILT

LONG REACH—26'

DIGS DEEP—17'

LIFTS HIGH—12'

Here's the completely hydraulic *mobile* shovel that equips you to do more jobs with lower equipment investment . . . *at greater profit!*

The 360 HOPTO swings three hundred and sixty degrees from its over-the-cab travel position. Operator's cab swings with unit for face-forward, *safe* operation. Feather-touch controls actuate every movement from positioning of outriggers to fast-cycling swing and 180° tilt of bucket! Heavy-duty hydraulic system with built-in relief valves gives an easily managed, oil-cushioned, 20 ton force to dipper stick!!!

Interchangeable backhoes and shovel buckets have H and L replaceable teeth and are available in three-eighths and one-half yard sizes. Check *NOW* on the many advantages of owning this work-hungry, mobile digger, shovel, crane!

Write today for complete information on the '360' or any one of six quarter-yard HOPTO Models!

BADGER MACHINE CO.

DEPT. E • WINONA, MINNESOTA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 346

Aerial map of Cuba to be prepared

An accurate contour topographic map covering all of Cuba is being prepared, the Cuban government having made a contract with the Aero Service Corp. of Philadelphia, Pa., for the work. The job will take two years and cost $1,100,000.

Field work carried on for ten years by the Instituto Cubano de Cartografia y Catastro and the Inter-American Geodetic Survey, supported by the U. S., has made the mapping project possible.

The scale to be used is 1:50,000, with ten meter contour intervals. The completed map will cover 324 sheets.

Duff-Norton promotes

The product manager of the Coffing Hoist Division, Duff-Norton Co., in Danville, Ill., is Andrew M. Kelly. He was promoted to the post recently after having served as manager of the firm's customer relations department.

SAVE MONEY
SEND US YOUR ORDERS FOR ROTARY SWEEPER NEW BROOM CORES

Do You Know We Manufacture NEW Cores of the Following Types:

- Grace (3 types)
- Hough
- M-B (Meili-Blumberg)
- Detroit-Harvester
- Fordson
- Rosco
- Little Giant
- Huber
- Lull
- Spearsvell

and other popular makes

YES! We Can Make Cores to Your Specifications

We Rebuild—Repair—Re-fill All Makes and Sizes of Broom Cores.

Immediate Shipment

SUGGESTION—To Far-Away Users—Buy your NEW Cores only without any filling or we will furnish complete Palmyra-Hickory or Bass Fibres—Kren Steel Wires.

Road Builders—It's Sensational!!

BIG PECKERWOOD BIG

C-O-N-T-I-N-U-O-U-S

Steel Wire Road Drag Leveler. Six (6) Inches Wide—Name Your Length

Not STAPLE set

In Stock Lengths of 4-6-8-9-10 or 12 foot.

Only $3.50 Foot "Approx. wt. 5½ lbs. per ft."

NO FRAME REQUIRED

The LITTLE PECKERWOOD

3" Wide, 15" Length

This Fits Your Frame

NOTE—Both Drags Can Be Furnished with Fibre.

Only $2.50 Ea.

KENNEDY'S

Since VAN BRUSH MFG. CO., INC. 1928

327 Southwest Blvd., Kansas City, Mo.

For more facts, circle No. 347

Restoration and remodeling of the capitol building at Nashville, Tenn., gets underway with a completion date scheduled for this year. The Lorain Moto-Crane is raising a concrete buggy that will be used to supply grout and concrete for pours between door sills.

Railroad grading for the Southern Railroad includes widening the right-of-way and other work northeast of Chattanooga. Oman Construction Co., Nashville, Tenn., uses a Euclid S-18 scraper that is push-loaded by a Caterpillar D9 in this hilly area.

U. S.-Canadian bridge to span St. Lawrence

Construction started last month on a new bridge that will span the St. Lawrence River between Rooseveltown, N. Y., and Cornwall, Ont., Canada.

McNamara Construction Co., Toronto, is currently constructing the forms for the bridge piers. The substructure will be built by Canada, and the steel superstructure by the U. S. The cost of the bridge is being shared by the United States and Canadian St. Lawrence Seaway Authorities.

H. K. Porter appoints

George T. Haffermehl has been appointed sales representative for the Leschen Wire Rope Division, H. K. Porter Co., Inc., New York. His territory includes the New England States and eastern New York State. Mr. Haffermehl was formerly with the Masury-Young Co.

SAVE MONEY!

UNUSED

6X6 ARMY TRUCKS

2½-ton GMC & International

- **From Government Storage!**
- **Unused and Guaranteed!**
- **Factory New Condition!**
- **Reconditioned Trucks also Available!**

Save up to $3,000 on one of our unused Army trucks. See for yourself how TWO of our trucks cost you even LESS than *one* new truck.

Compare our Tandem Axle Trucks with front wheel drive, 10 forward speeds, overdrive and new mud and snow tires with similar equipment elsewhere.

Investigate now! . . . There's no obligation . . . and we deliver on approval!

For Specifications, Prices, Delivery Write, Wire or Phone Collect—JAckson 5-7841
MILTON Y. TOOMBS, JR.
Sales Manager

MEMPHIS EQUIPMENT Company
CONSTRUCTION AND AUTOMOTIVE EQUIPMENT AND PARTS
768 SO. THIRD ST. MEMPHIS, TENNESSEE

For more facts, circle No. 348

The New UNIT Model 510 Challenger ... as a Trenchoe

DESIGNED with a BACKGROUND of 3/8 YARD EXPERIENCE

Evidence of highest quality engineering and construction includes alloy steels and forgings • anti-friction bearings • modern transmission design with involute splines to add strength and reduce wear • straight-in-line engine mounting with torque converter • trunnion supported tapered drums to eliminate bending stress on drive shafts • easily accessible hydraulic clutches • minimum number of main machinery gears enclosed in one-piece cast gear case • force feed lubrication • self-aligning replaceable hook shoes distribute applied pressure over maximum area • interchangeability of parts simplifies maintenance, cuts costs. All these UNIT advantages mean more profitable operations for you.

Why it's BEST to INVEST in modern UNIT models

Because each feature has been proven to contribute substantially to the Life, Performance and Efficiency which have made present and previous UNIT products readily acceptable.

Send for Bulletin Now...Use Coupon!

UNIT CRANE & SHOVEL CORP.
6309 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

Geared to boost your earnings!

UNIT CRANE & SHOVEL CORP.
Milwaukee 14, Wisconsin

Please send me your new Bulletin on the UNIT CHALLENGER Model 510.

Name.....
Address.....
City.....
State.....

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 349

Construction camera

A semi-hot mix, consisting of pit-run aggregate heated to 190 degrees F and mixed with emulsified asphalt is turned out by a Barber-Greene plant at a rate of 200 tons per hour for a 12-mile highway job between Port Jefferson and Nesconset, Long Island, N. Y. Emulsified asphalt was supplied by the Inwood,

Long Island, plant of American Bitumuls & Asphalt Co. Lizza & Sons of Oyster Bay, N. Y., put down the 7-inch-thick base course in three lifts. The first two were spread by blade-graders; the last lift and the 1-inch surface course were placed by this Barber-Greene finisher.

Telescopic hoists

■ A catalog describing the complete Galion Allsteel line of telescopic hoists is available from the company. The literature details and illustrates various Uni-scopic single front-mounted and Duo-scopic twin front-mounted telescopic hoists.

According to the manufacturer, the hoists permit the hauling of increased payloads within legal weight limits by reducing hoist dead weight and by shifting body and payload weight forward onto the truck's front axle.

Descriptions and specifications cover nine hoist models with payload capacities of from 9 to 34 tons. Matching bodies and payload-adding accessories are included.

To obtain this literature write to the Galion Allsteel Body Co., Galion, Ohio, or use the Request Card at page 18. Circle No. 45.

Generator control panels

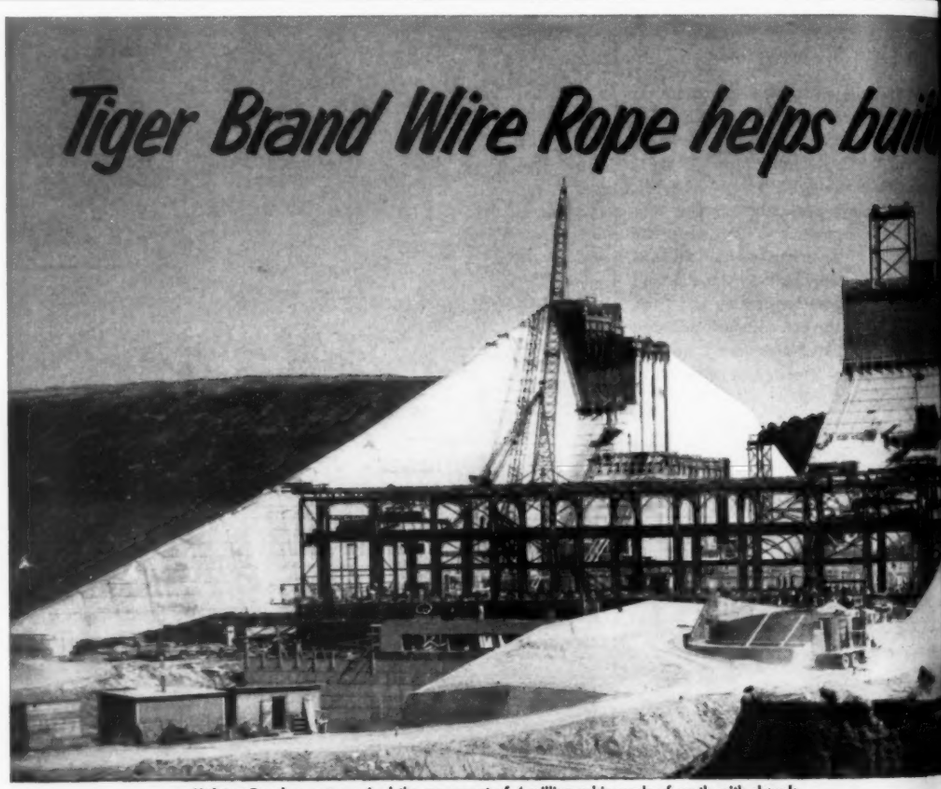
■ Literature describing its generator control panels is available from the Kato Engineering Co. Details on the company's line of floor, wall and generator-mounted units are included. Floor-mounted models range from 72 to 96 inches in height and wall-mounted models from 30 to 48 inches. The generator-mounted units, which can be straddle, rear, or side-mounted, are available in heights down to 12 inches.

To obtain PAN 1156 write to the Kato Engineering Co., 1415 First Ave., Mankato, Minn., or use the Request Card at page 18. Circle No. 11.

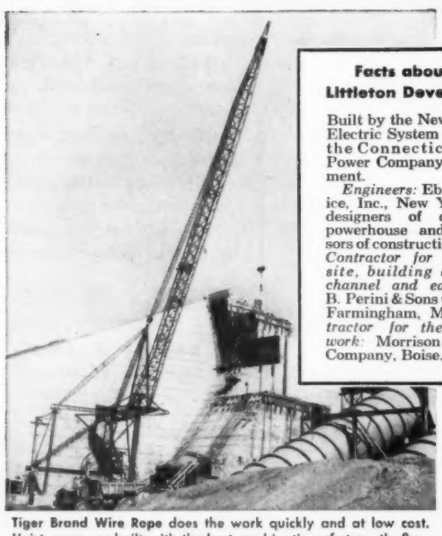
Vermiculite systems

■ A booklet of data on vermiculite plaster and acoustical systems is available from the Zonolite Co. The booklet contains a summary of fire tests on vermiculite systems, suggested specifications, and information on all uses of vermiculite in plastering and acoustical treatment. Special attention is given to machine methods of applying light plaster.

To obtain this booklet write to the Zonolite Co., 135 S. LaSalle St., Chicago 3, Ill., or use the Request Card at page 18. Circle No. 34.



Littleton Development required the movement of 4 million cubic yards of earth with shovels and scrapers which used a considerable amount of Tiger Brand Wire Rope in the process.



Tiger Brand Wire Rope does the work quickly and at low cost. Hoist ropes are built with the best combination of strength, flexibility and abrasion resistance to assure long life.

Facts about the Littleton Development

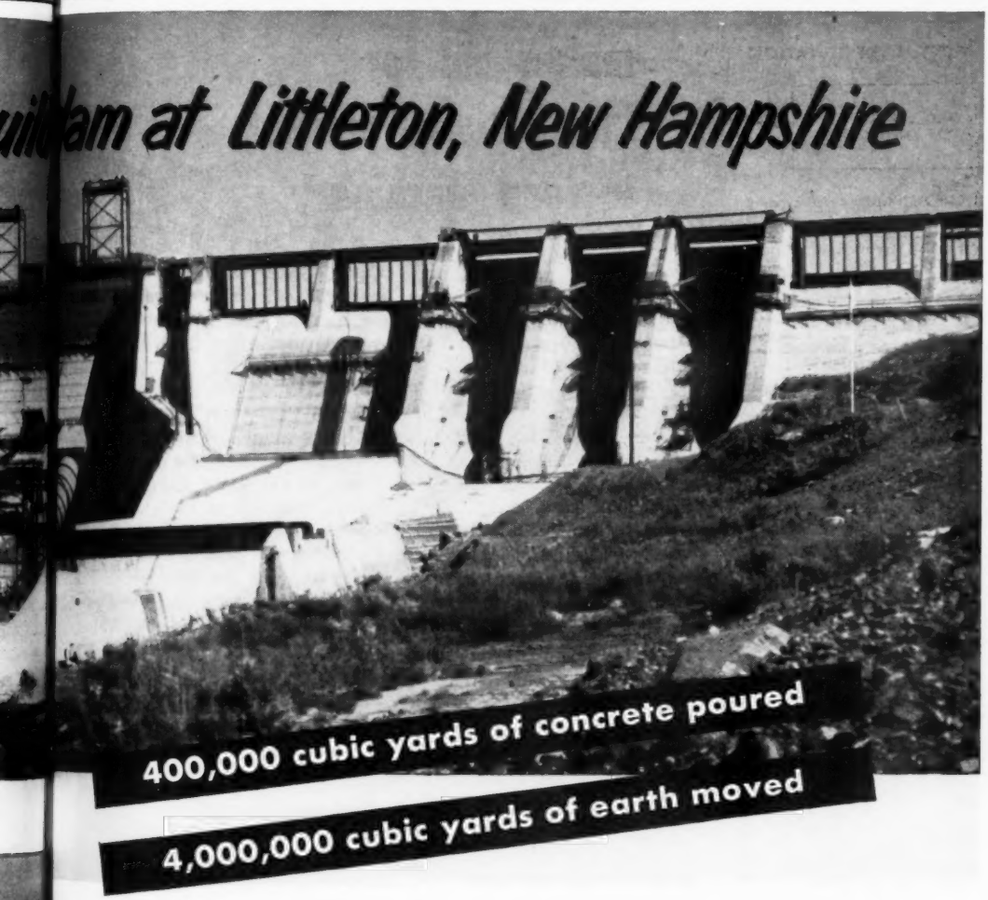
Built by the New England Electric System as part of the Connecticut River Power Company Development.

Engineers: Ebasco Service, Inc., New York City, designers of dam and powerhouse and supervisors of construction of both. *Contractor for preparing site, building diversion channel and earth dam:* B. Perini & Sons Company, Farmingham, Mass. *Contractor for the concrete work:* Morrison-Knudsen Company, Boise, Idaho.

Pouring 400,000 cubic yards of concrete means the crane's l ropes take a lot of punishment. Standard Tiger Brand Rope used in this operation.

Hauling, grading, and drainage work for the $2 million two-story Sears, Roebuck store in Kalamazoo, Mich., involves moving 25,000 yards of excavation and borrow for the 700-car parking lot. The TD-9 backfilling drain pipe and the T-9 swing crane, above, are two of 31 International rigs on this job.

Bigger planes mean longer runways, and such work as grading a 2,000-foot extension for Hulman Field, Terre Haute, Ind. This Allis-Chalmers HD-19 pushloads an Allis-Chalmers TS-300 scraper on the $1,222,488 project, which is designed to accommodate an Air National Guard jet plane squadron.



e new "Samuel C. Moore Station" the New England Electric System res honors with Camerford as the largest hydro stations in New gland.

The rating of the station will be ,000 kilowatts. The height of the n is approximately 165 feet. The e of the lake impounded is the gest on the Connecticut River, 11 es long and covering 3500 acres.

To build this dam, the contractors had to move approximately 4,000,000 cubic yards of earth and pour about 400,000 cubic yards of concrete. The concrete was hauled about a mile to the job in 4-cubic-yard buckets. These were hoisted from the truck to the position on the dam by cranes and the concrete was dumped into the forms.

The contractor for the concrete work was Morrison-Knudsen Company, Boise, Idaho, and the contractor for preparing the site, building diversion channel and earth dam was B. Perini & Sons, Framingham, Mass.

Both contractors used large quantities of American Tiger Brand Wire Rope. It is interesting to note that all the wire rope needs for this job could be supplied from the standard types of Tiger Brand Rope.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

USS

UNITED STATES STEEL

For more facts, use Reader-Reply Card opposite page 18 and circle No. 350

Belting and hose

■ Twenty-three products for the construction industry are described in a catalog from the Industrial Rubber Division of the Thermoid Co. The catalog contains application data, construction details, and size specifications of three types of conveyor and elevator belting; 14 types of air, water steam, and welding hose; and the various types of brake lining and blocks manufactured by the company for construction machinery.

Included are dimensional and construction data on standard and Hi-Capacity V-belts, and 19 cutaway drawings of the construction details of many of the products.

To obtain Form No. 3703 write to the Thermoid Co., 400 Whitehead Road, Trenton 6, N. J., or use the Request Card at page 18. Circle No. 32.

Stud welding spex

■ A booklet on industry standards in arc-welding studs, pins, and tapped pads for stud welding is available from K S M Products, Inc. The booklet contains a complete index and reference to equipment and accessories used in stud-welding applications.

Each specification page lists size minimums and maximums. It details mechanical properties, chemistry, thread sizes, plating and annealing information, and other data valuable to engineers, and production and purchasing men.

To obtain this publication write to K S M Products, Inc., Merchantsville 8, N. J., or use the Request Card at page 18. Circle No. 50.

Volpe reorganizes BPR

In reorganizing the Bureau of Public Roads, John A. Volpe appointed F. C. Turner deputy commissioner and chief engineer; G. M. Williams, assistant commissioner for engineering; J. Barnett, deputy assistant commissioner for engineering; A. C. Clark, assistant commissioner for operations; J. C. Allen, assistant commissioner for administration; and E. H. Holmes, assistant commissioner for research.

The tractor-drawn D-222 scraper resembles similar cable-operated haul units in this country. The tractor is an 80-hp unit. ►

NOW! PROGRAM CONTROLLED FREEZE-THAW CHAMBER

FOR TESTING CONCRETE AND AGGREGATES

THE ONLY "ALL-IN-ONE" UNIT FOR A.S.T.M. DESIGNATION

C-290-52T
C-291-52T
C-292-52T
AND OTHER TEST CONDITIONS

WRITE FOR LITERATURE

CONRAD Inc.
HOLLAND, MICHIGAN

300% FASTER THAN OLD METHODS! As many as 8 freezing-thawing cycles per 24-hours are automatically produced in this new Conrad unit. Saves time, labor — no need for operator during repeat cycles, no transferring test materials from one cabinet to another. Fully proved, self-contained, ready to operate. Power filling and draining.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 351

Soviet Russia makes bid for international market in road machinery

The following is a translation of an article on Soviet roadbuilding machinery which appeared in the March, 1956, issue of Vneshnyaya Torgovlya, official organ of the U.S.S.R. Ministry of Foreign Trade. The article is reprinted here verbatim. Where unfamiliar terms or measurements occur, their equivalents in this country are enclosed in parentheses.

The manufacture of road machinery is one of the big branches of Soviet industry. Road machinery now being produced in the U.S.S.R. in great variety not only assures mechanization of road construction and repair but, to a large degree, also eliminates manual labor in maintenance of existing roads.

We will take a look at individual basic types and variations of road machinery which have been widely used in the Soviet Union and are being operated in many countries with well-deserved success.

One of the road machinery types that has won universal recognition due to its successful design and general usefulness is the bulldozer.

Bulldozer Models D-195B, D-271

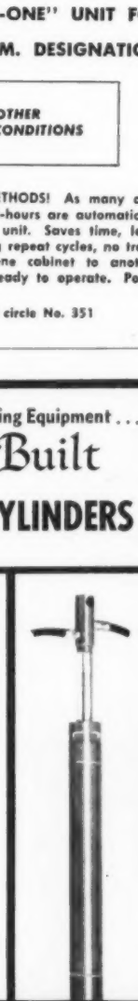
For Performance You can Depend on in Materials Handling Equipment . . .

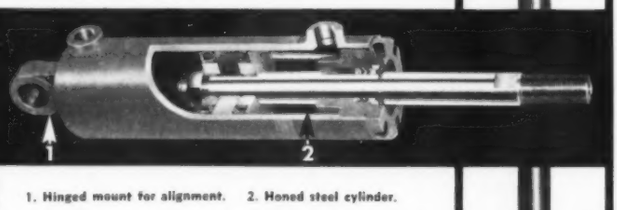
BHEW Custom-Built HYDRAULIC CYLINDERS

Whatever your cylinder requirements, you're sure of dependable operational performance with efficient, close-tolerance BHEW cylinders that require minimum mounting space. Built to your specifications, their cost is reasonable; there is no charge for tooling; they are delivered on schedule.

BHEW CYLINDER FEATURES: • Standard and special designs available. • Double or single acting and telescopic. • 1½" to 8" bore. • Strokes up to 156". • Smallest possible O. D. and retracted O. A. length. • Oil cylinders with 1,500 psi or 3,000 psi working pressure, pneumatic up to 150 psi. • Cup-type, ring-type or O-ring construction. • Choice of mounting.

For full information, send us specifications of your requirements





1. Hinged mount for alignment. 2. Honed steel cylinder.

Do you have cylinder problems? Our engineers will be happy to work with you without charge.

Double-Acting 2-piece Piston Rod Cylinder. It is excellent for extending and retracting boom arm. Both hoses are connected on rod end.

BHEW BENTON HARBOR ENGINEERING WORKS, Inc.

622 Langley Avenue St. Joseph, Michigan

For more facts, use Reader-Reply Card opposite page 18 and circle No. 352

WHY LUFKIN HI-LINE WOVEN TAPES are more accurate

Percentage variation caused by moisture or temperature less than .000405.
Tensile strength 21,036 PSI.
Miracle epoxy resin coating, waterproof; corrosion and abrasion resistant.
Woof thread is one continuous piece of synthetic dimensionally stabilized yarn.
Abrasion resistant clear plastic.
Jet black protected markings.
34 warp threads of full length synthetic, dimensionally stabilized yarn.

Here's a woven tape that approaches the accuracy of metal tapes. Made from continuous, synthetic, dimensionally stabilized fibres that are non-conductive and have high dielectric strength. The thirty-four lengthwise warp strands are interwoven with endless cross strands so that there are no ends to fray on the edges. Attractive leather case with rust-resistant steel liner. 25 to 150 foot lengths.

BUY LUFKIN TAPES • RULES PRECISION TOOLS AT YOUR HARDWARE OR TOOL STORE

THE LUFKIN RULE CO., Saginaw Mich.
New York City Barrie, Ontario

436

For more facts, use Reader-Reply Card opposite page 18 and circle No. 353

and D-259, all equipped with caterpillar (crawler) treads, are now in wide use.

The Model D-159B bulldozer moves a 0.75-cubic-meter (one cubic yard) mass of earth at one time and has a productivity of up to 225 cubic meters (294 cubic yards) in 8 hours when shifting the dirt a distance of 50 meters (165 feet).

The D-159B bulldozer is mounted on the 54-horsepower DT-54 caterpillar (crawler) diesel tractor. Its working part is a concave steel moldboard 2,280 millimeters (7½ feet) wide and 300 millimeters (one foot) high. A removable blade made of high-quality steel is attached to the bottom edge of the moldboard. Rib-stiffened flanges welded to the ends of the moldboard provide sturdiness and, in addition, prevent the earth from spilling away. To regulate the thickness of the layer being cut away, the moldboard has disk-type supporting skis or shoes which can be set higher or lower than the cutting edge of the blade.

The moldboard can be lifted to a maximum height of 600 millimeters (24 inches) and lowered as much as 150 millimeters (6 inches). This is accomplished by two hydraulic cylinders actuated by a gear pump which feeds oil under a pressure of 30 atmospheres (440 psi). The pump works off the tractor power selector shaft (power takeoff) through a multiplier which increases the number of pump revolutions.

The bulldozer's controls are concentrated in the tractor cab.

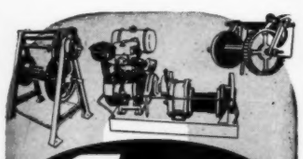
Thanks to its simplicity of design, reliability in operation, and high maneuverability, the Model D-159B bulldozer is widely used for the most varied types of work.

The Model D-271 and D-259 bulldozers are mounted on the 93-horsepower S-80 caterpillar (crawler) tractor.

They have moldboards of especially sturdy design with removable blades with special wear-resistant alloys. As differentiated from the Model D-159B bulldozer, control of the lifting of the moldboard—to a height of 900 millimeters (35 inches) for the Model D-271, a height of 900 millimeters (35 inches) for the Model D-271, and a height of 1,100 millimeters (43 inches) for the Model D-259—and lowering of the moldboard into the ground—to a depth of 1,000 millimeters (39 inches)—is achieved by a ropeblock drive from a

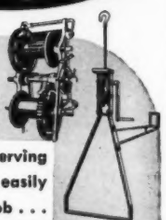
(*Continued on next page*)

The T-107 overhead loader, mounted on an 80-hp crawler, has two buckets of 4 to 6-cubic-meter capacity each. The front bucket dumps to the second, which fills a follow-up truck.



Sasgen

Derricks
Hoists
Winches

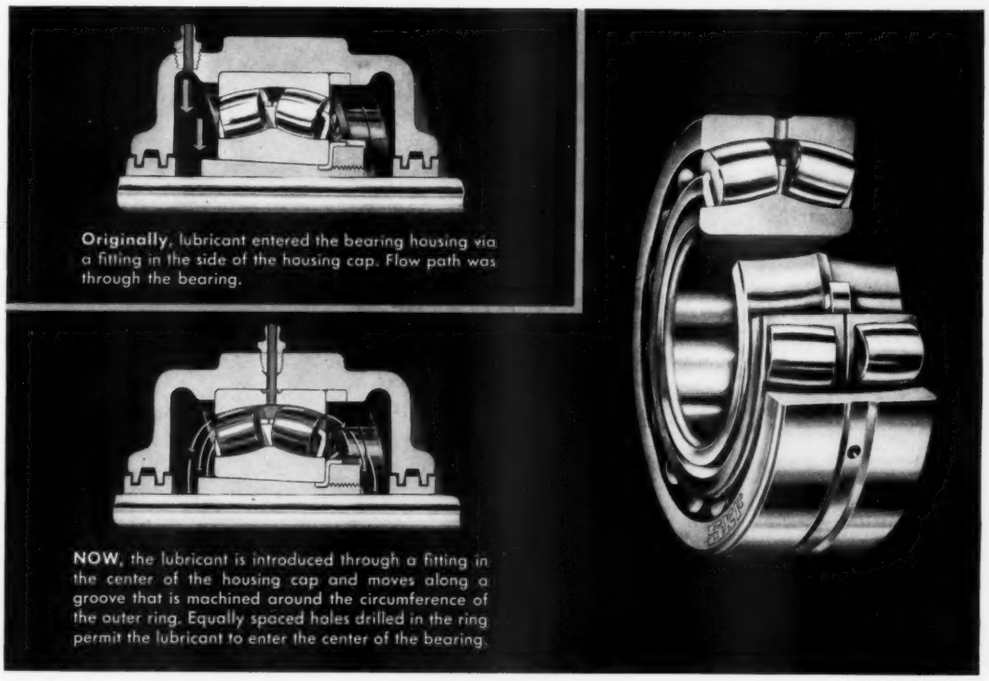


Over 50 years serving contractors . . . easily rigged on the job . . . conservatively rated for safety . . . simple in design . . . low-cost maintenance.

See your dealer . . . or write for latest catalog.

Sasgen DERRICK COMPANY
3127 W. GRAND AVE., CHICAGO 22, ILLINOIS
For more facts, circle No. 354

At No Extra Charge . . . A MAJOR IMPROVEMENT IN LUBRICATING SPHERICAL ROLLER BEARINGS



Originally, lubricant entered the bearing housing via a fitting in the side of the housing cap. Flow path was through the bearing.

NOW, the lubricant is introduced through a fitting in the center of the housing cap and moves along a groove that is machined around the circumference of the outer ring. Equally spaced holes drilled in the ring permit the lubricant to enter the center of the bearing.

Nobody but SKF Offers This to You on Spherical Roller Bearings

Once again **SKF** offers another important innovation in spherical roller bearing design. Available in spherical roller bearings 140 mm (5.5118") O.D. and larger, this feature represents a still further improvement to the proven **SKF** Type "C" Spherical Roller Bearing.

The new design allows the lubricant to enter at the *center* of the bearing and move outwardly – completely covering all working surfaces. Old lubricant is flushed away from the bearing and, with it, any abrasive dust, dirt, moisture, or other impurities.

You can use this improved bearing in your existing housings simply by moving the lubrication fitting to the center.

Here again is an example of how **SKF** helps you to obtain longer bearing life, at no added cost. Send for Bulletin No. 443 for complete details. 7751

EVERY TYPE—EVERY USE

SKF®

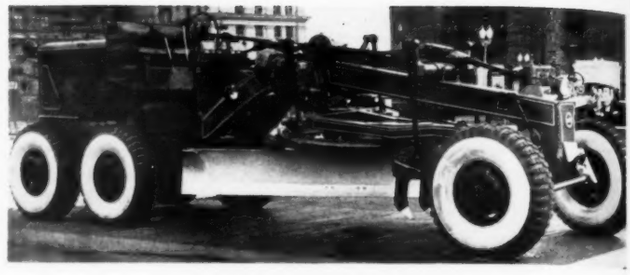
Ball Bearings
Cylindrical Roller Bearings
Spherical Roller Bearings
Tapered Roller Bearings (Tyson®)

*Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 355

The D-144 heavy-type autograder is the Soviet's boast in the grader class. The machine resembles American graders in many respects. ►



(Continued from preceding page)

single-drum winch activated from the tractor power selector shaft (power takeoff). The control lever for the winch is located in the tractor cab. The hinged fastening of the moldboard to the pushing beams permits the cutting angle to be changed easily. By adjusting the shoes, the moldboard on the D-259 bulldozer can be fixed at various angles relative to the direction of movement. This significantly increases the useful sphere for this bulldozer and enables it to do work which ordinarily bulldozers cannot accomplish. Such work, for example, includes the filling of trenches, ditches, and canals by lateral movement of the earth while the bulldozer is moving longitudinally. It also includes the cutting of slopes and the laying out of terraces. The design of the Model D-259 bulldozer also permits changing the angle of the transverse pitch of the blade on both sides.

Scrapers in wide use

Two Soviet scrapers are in quantity production and are widely used. These are a scraper with hydraulic control which operates as a trailer attached to the 54-horsepower Model DT-54 tractor and a scraper with a rope-block control system which operates as a trailer hooked to the 93-horsepower S-80 tractor.

The working part of the scrapers is the scoop with removable blades of rigid, welded construction.

Beginning last year an improved scraper—the Model D-354 with a scoop capacity of 2.75 cubic meters (4 cubic yards)—was put into production. This scraper is changed into transporting or working position by lowering or raising the scoop through operation of a piston in a hydraulic pump mounted on the tractor and works from the tractor power selector shaft. The oil-carrying hoses are enclosed in metal casing, protecting them from mechanical damage. The lever of a hydraulic distributor located in the tractor cab controls the scraper. All elements of the hydraulic drive are completely uniform with the D-159B bulldozer.

The Model D-222A scraper with a scoop capacity of 6 to 8 cubic meters (8 to 10 cubic yards) is also widely used. It is changed from transporting to loading position by lowering the scoop with a two-drum winch mounted on the tractor and to unloading position by lifting the bottom.

The control lever for the D-222A is located in the tractor cab.

Both attached graders and autograders (self-propelled graders) are manufactured in the Soviet Union and are used effectively for shaping dirt roads, for making side ditches in triangular or trapezoidal profile,

S-E-A-S* In Action...on the Job!

ELLIS METHODS OF CONCRETE CONSTRUCTION PROVE THEMSELVES AGAIN!

*S E A S

SPEED — Ellis Shores, Heads, and Double Heads go "up and down" faster and require fewer men than other shoring methods. Great savings are made in erection time because one-man "slip-in" shores constitute a big part of the job.

ECONOMY — The initial cost is low. Hundreds of re-uses mean further economy. Add to that the savings in time and forming materials per job — here is a profit item worth considering!

ADAPTABILITY — The same shores and heads can be quickly adapted from one job to another (suspended reinforced concrete floors to sloping ramps, for example). No complicated expensive measuring, cutting, splicing, blocking and wedging!

SAFETY — The Ellis Clamp's patented pivotal plate gripping surface actually holds tighter as the load increases. The Ellis Shore is double-thick in the middle for extra safety.

NEW 17-STORY PETROLEUM CLUB BUILDING IN SOUTHWEST USES ELLIS METHODS THROUGHOUT

Suspended reinforced concrete floors all the way up . . . and Ellis Methods are helping to produce a beautiful and economical job! The rows of double shores and heads demonstrate one method of shoring. An Ellis Shore is inserted into the Ellis Head Clamp at one end of the Ellis Double Head, erected, then the second shore is slipped into the Ellis Slip-In Shore Holder at the other end. It's SPEEDY, ECONOMICAL, ADAPTABLE, SAFE!

ELLIS Mfg. Co., Inc. 211 NORTHWEST 4th STREET OKLAHOMA CITY, OKLAHOMA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 356

CONTRACTORS

—are you getting your share of PRESTRESSED BRIDGE JOBS?

Here's good news for contractors bidding on the ever-increasing number of prestressed concrete bridge jobs throughout the country! From a single supplier—The Intercontinental Equipment Co., Inc.—now you can get the full line of Freyssinet-engineered material and equipment for prestressing. This means top quality, competitive pricing, and immediate delivery of products developed by the most famous name in its field.

Here are the basic units you'll need for your next prestressed bridge job:

ANCHORAGE UNITS	TENSIONING JACKS	GROUT MIXER
CABLE ASSEMBLIES	HYDRAULIC PUMP	GROUT PUMP

With these products available, every contractor can bid on any prestressed structure with convenience and assurance of lower cost.

So, for full details and a free copy of your products catalogue, write, wire, or telephone now to

INTERCONTINENTAL EQUIPMENT CO., INC.

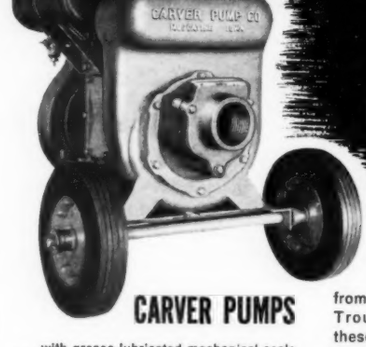
Prestressed Concrete Division

120 Broadway, New York 5, N. Y.

Member Prestressed Concrete Institute

For more facts, use Reader-Reply Card opposite page 18 and circle No. 357

...For Real Protection against Shaft Leakage...



GREASE LUBRICATED MECHANICAL SEALS

CARVER PUMPS

. . . with grease-lubricated mechanical seals . . . are your best guarantee for lightning fast prime, outstanding performance and minimum operating costs.

Depend on CARVER for the complete line of contractors pumps from 4000 G.P.H. to 250,000 G.P.H. Trouble-free and maintenance-free these CARVER PUMPS are "Your Best Buy for Better Performance!"

Write the factory or see your CARVER Distributor for complete information.

CARVER PUMP CO., 1404 Hershey Ave., Muscatine, Iowa

CARVER — The Quality Name in Pumps

The quality name in pumps

For more facts, use Reader-Reply Card opposite page 18 and circle No. 358

for raising embankments from side reserves of dirt, for construction of roadbeds or terraces for plants on slopes, for laying on the roadbed the base for the traveled part of the road, for leveling the dirt roadbed, for mixing dirt, gravel or crushed stone on the roadbed with added binding materials, for making and cleaning irrigation canals, and also for repairing dirt, crushed rock and gravel roads.

Graders are widely used in road, industrial, housing, airport, irrigation and hydrotechnical projects, in agriculture, and also during winter for cleaning snow from roads.

The heavy Model D-20B grader is an attachment to the S-80 tractor. Its main working part is a moldboard 3,700 millimeters (2½ feet) long and 505 millimeters (1 foot 8 inches) high. A removable blade is fastened to the moldboard's bottom edge. Length of the moldboard can be increased to 4,500 millimeters (14 feet 9 inches) by means of an extension arrangement which is fastened to the moldboard by bolts.

The Model D-20B grader is equipped with a banker which works with two blades set at an angle to each other. This permits shaping the ditches either triangularly or trapezoidally. For smoothing the sides of embankments, the machine is additionally equipped with a bank leveler which is a section of the moldboard with a blade hinged to the moldboard at one end and at the other end attached to the frame of the grader with a rod and chain.

The moldboard can be pushed to the side with the aid of the rod to a maximum distance of 460 millimeters (1½ feet). By readjusting the moldboard, it can be moved as much as 546 millimeters (1 foot 9 inches) to the side. In addition, the moldboard can be raised to a maximum height of 300 millimeters (1 foot) and also set at an angle to the vertical and horizontal planes. The steering wheels and control levers are located on the grader itself.

The Model D-20B grader is delivered either equipped with metal wheels or, at the request of the customer, with pneumatic tires. Its productivity in eight hours of work in dirt of categories I to II with bank heights of 0.5 meters (2 feet) without previous loosening of the dirt is 275 cubic meters (360 cubic yards). With dirt of categories III and IV with preliminary loosening of the dirt and with the same embankment heights as above, the eight-hour work productivity is 250 cubic meters (327 cubic yards).

The Model D-241 (medium) attached grader patterned after the D-20B and differing from it only in its smaller size is in great demand. Moldboard length on the Model D-241 is 3,000 millimeters (9 feet 10 inches) instead of the 3,700 millimeters (12 feet 2 inches) for the Model D-20B. The Model D-241 also lacks mechanism for slanting the front wheels. For work in making terraces on slopes and in mountainous areas, the front end of the Model D-241's frame is mounted directly on the tractor's hitching apparatus.

Soviet autograder

During recent years, self-propelled autograders have been widely used. They have great maneuverability and speed of movement, are easily controlled by a single driver, and are able to perform various kinds of grader work.

Thanks to its operational qualities, the Soviet Model D-144 heavy autograder has won great popularity.

This autograder consists of the working equipment, the KDM-46 diesel engine, transmission (including

(*Continued on next page*)

This front-end stumper, cable-operated from the tractor cab, exerts a stumping effort equal to 45 tons and is said to pull upwards of 400 stumps per hour.

"ONE DEMONSTRATION OF THE NO. 955 TRAXCAVATOR* AND I WOULDN'T LET THEM TAKE IT BACK!"

F. V. Minor, Dallas, Texas

F. V. Minor had a subcontract from Austin Bridge Co. to dig bridge abutments and clean up dirt along a railroad overpass retaining wall west of Dallas. The earth was packed hard and when he tried to use a loader of another make, he found the machine just couldn't get into it.

Then the Caterpillar Dealer brought a No. 955 Traxcavator out to demonstrate. And once he'd seen how it did the work, Mr. Minor wouldn't let them take it away. A lot of other contractors know just how he felt. The Caterpillar No. 955 Traxcavator has been a success from the day it was introduced. It really licks the tough jobs.

This fast, efficient excavator-loader has a 1½-cu.-yd. bucket, 80 inches wide. A dependable 70 HP CAT* D315 Engine gives it plenty of digging power in tough materials. The bucket has full 40-degree tilt-back at ground level to prevent spillage, and 128-inch lift height for easy loading.

Operators like the No. 955 for its exceptional visibility and fast-acting hydraulic controls. Bucket lift and tilt levers are positioned for easy one-hand operation. And the exclusive Caterpillar oil clutch adds to long work life and reduces maintenance.

If you've got a difficult excavating problem, ask your Caterpillar Dealer to demonstrate a Cat-built Traxcavator right on your job. In addition to the No. 955, he can show you the No. 933 (1 cu. yd., 50 HP) and the No. 977 (2¼ cu. yd., 100 HP). He'll prove to you that they're built to do more work and harder work at lower cost. You can count on him, too, for prompt, reliable service and parts you can trust. Talk to him today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

For more facts, use Reader-Reply Card opposite page 18 and circle No. 359

(*Continued from preceding page*)

a clutch, gear box, multiplicator and main and flanged Gardan shafts), tractive and main frames, undercarriage, and control mechanisms.

Its working part is a moldboard 3,700 millimeters (12 feet 2 inches) long and 540 millimeters (1 foot 9 inches) high which moves 380 to 660 millimeters (1 foot 3 inches to 2 feet 2 inches) to both sides, can be lowered into the ground to a depth of 200 millimeters (8 inches), and can be raised 400 millimeters (1 foot 4 inches) above the supporting surface. The moldboard blade is removable and consists of two parts. It is made of high-quality steel. To prevent fast wearing of the blades, protective covers are set along their entire width at both ends. The autograder has a scarifier for preliminary loosening of hard earth to a depth of 200 millimeters (8 inches). The machine's front wheels can be tilted to a maximum angle of 23 degrees from vertical. This improves its mobility and increases its stability and maneuverability.

The control mechanisms are concentrated in the immediate area of the driver.

The Model D-144 has eight forward gears and two reverse gears and has a wide range of speeds. It can move forward at speeds of 2.25 kilometers per hour (1.4 mph) to 26.7 kilometers per hour (16.6 mph) and reverse at speeds from 2.2 kilometers per hour (1.37 mph) to 6.56 kilometers per hour (4.1 mph).

The middle-type autograder—the Model D-265—resembles the D-144 autograder in design. It has a moldboard 3,040 millimeters (9 feet 3 inches) long (3,800 millimeters (12½ feet) with extension) and 500 millimeters (1 foot 8 inches) high.

At the request of the customer, a scarifier can be delivered with the autograder. It is installed instead of the moldboard and blade. An attachment which lengthens and widens the moldboard and banker can also be provided.

The moldboard has a lateral movement up to 450 to 500 millimeters (1½ feet to 1 foot 8 inches) on both sides. For cutting on slopes it can be tilted up to 70 degrees. The moldboard can be lowered a maximum of 250 millimeters (10 inches). The grader is equipped with an operationally reliable 54-horsepower diesel engine. This autograder has six forward gears and two reverse gears. It has a forward speed range of 1.2 to 32 kilometers per hour (0.75 to 19.9 mph) and of 1.4 to 11 kilometers per hour (0.87 to 6.8 mph) in reverse.

The Model D-192 grader-lift is widely used when there are large volumes of excavation work, for raising embankments from reserves of dirt on the sides, for making semi-embankments on slopes with a cross gradient up to 20 degrees, for working hollows or ditches by moving dirt in the moldboard and loading the removed dirt into trucks or other transporting vehicles, and for a number of similar jobs.

Having a high degree of productivity—up to 400 cubic meters (523 cubic yards) per hour—this model grader-lift is an irreplaceable machine for making railroad embankments in road, for irrigation and improvement projects, in hydrotechnical construction, and in stripping work in mining.

The grader-lift is a trailer attachment to the S-80 tractor. Its working parts consist of a cutting disk, engine, central reducer, plow frame, conveyor, undercarriage, and frame on which the control mechanisms are located.

The cutting disk of 800 millimeters (2 feet 7 inches) diameter is made of high-quality steel. With the aid of this disk, the earth is cut and carried onto the conveyor belt, which throws the dirt into the moldboard or into a truck or other transporting vehicle. Height at which the earth is removed is regulated by the slope of the conveyor, which has a length of 8,500 millimeters (19 feet 7 inches) and a belt width of 1,200 millimeters (3 feet 11 inches).

Drive for the grader-lift's mechanism is furnished by a diesel engine mounted on the front part of the frame. All of the control levers are concentrated around the operator, whose station is at the rear of the grader-lift.

Soviet industry produces a number of types of machinery for preparatory work in laying out road rights-of-way.

Rooter-gatherer

The Model D-210V rooter-gatherer is used successfully for uprooting stumps with a diameter up to 35 centimeters (1 foot 2 inches), for removing brushwood, fallen trees and rocks weighing up to three metric tons (1⅓ tons), for felling trees with a trunk diameter up to 35 centimeters (1 foot 2 inches), and also for loosening the soil. The Model 174B brush cutter, which cuts trees with trunk diameters up to 30 centimeters (1 foot), is used to clear areas of undergrowth and saplings.

The Model D-210V rooter-gatherer and Model 174B brush cutter are mounted on the S-80 caterpillar (crawler) tractor.

The working part of the rooter-gatherer is a sturdy moldboard with a catching width of 1,474 millimeters (4 feet 9 inches) and consists of four

Pouring concrete in strips 12 feet wide on a new expressway, Koehring 34-E *twinbatch* paver averaged 1100 feet per 8-hour day. 10-inch slab consisted of 8-inch mesh-reinforced base, 2-inch top course.

PLAN YOUR SPREAD FOR

the heavy paving program ahead

Long-range outlook on the extensive road program, and new "jet-age" airbases, indicates a steadily-rising curve of construction activity in all areas. It also indicates plenty of paving business ahead for the contractor who is in a position to compete favorably in the bidding, and who can profitably complete contracts *on schedule.*

In planning your equipment spread, you can't afford to gamble on the production end of your job — *at the paver,* where every second counts. That's where the *reserve* production capacity of a Koehring 34-E *twinbatch*® protects your schedules and profits. It hits a top output of 86.7 batches an hour, on 60-second mixing cycle. This lets you pick up any lost time, when you need it, to offset normal job and material delays — maintain a high *average* speed throughout duration of the job — keep batch plant, trucks and finishers working at peak efficiency. With *twinbatch* Autocycle control, every mixing operation is automatic, accurate, and fast. Drum charging, mixing, transfer and discharge are all synchronized by Koehring Batchmeter, a simple timing device. 8-second skip-hoist speeds charging. Big, double-door bucket and wide-swinging boom speed concrete distribution on the grade. What's more, accessibility of every paver maintenance point, plus heavy-duty construction, all help to keep paving jobs rolling *on schedule.*

You'll find there's no substitute for the steady output, speed and economy you can get with 34-E *twinbatch* pavers on your big-production highway and airport contracts. Talk it over with your Koehring distributor. He has more information that will interest you. Why not call him *today?*

vertical supports connected at the upper part by two cross beams and at the lower part by face plates. In the sockets of the moldboard supports are fastened four removable teeth made of high-quality steel and faced with hard alloys.

The working part of the brush cutter is a wedge-shaped moldboard with horizontal, removable cutting blades, 3,200 millimeters (1½ feet) long. Stumps are cut off by a steel blade welded to the front part of the moldboard. The felled trees are pushed aside as the machine moves forward.

Raising and lowering of the moldboard on both the rooter-gatherer and the brush cutter are accomplished by a cable drive from a single-drum hoist whose control lever is located in the tractor cab. The hoist drive comes from the tractor power selector shaft.

Productivity of the Model D-210V rooter-gatherer in an eight-hour work shift is 150 cubic meters (196 cubic yards) in removing stones. In uprooting stumps of 30 to 35 centimeters (1 foot to 1 foot 2 inches) diameter the eight-hour productivity is 400 stumps. In removing fallen trees, uprooted stumps and brushwood, the eight-hour productivity is up to six hectares (14.8 acres). In loosening the ground to a maximum depth of 400 millimeters (1 foot 4 inches), the eight-hour productivity is up to three hectares (7.4 acres). The productivity of the Model 174 brush cutter in clearing areas is up to six hectares (14.8 acres) in eight hours of work.

In loosening heavy and rocky soil to a maximum depth of 550 millimeters (1 foot 10 inches) and in tearing up old road surfaces for repair and reconstruction of the road, the heavy Model D-162A soil pulverizing attachment is used. It consists of five soil-loosening teeth, traction and lifting frames, blocks, couplings, a two-pitch wheel movement and a hoist. The loosening teeth are powerful steel supports with removable shoes whose working surfaces are faced with hard alloys.

Productivity of this soil pulverizer in medium soils during an eight-hour work shift is up to four hectares (9.9 acres) when the towing tractor is operated in first speed (2.25 kilometers per hour or 1.4 mph) and up to six hectares (14.8 acres) when the towing tractor is in second speed (3.6 kilometers per hour or 2.2 mph).

The tree-roller, self-propelled, 10-ton Model D-211 roller produced by Soviet industry has been widely utilized for rolling dirt roads and road foundations, for packing gravel, crushed stone and asphalt-concrete surfaces, and for construction and repair of automobile highways, city streets and squares.

The working parts of this roller consist of a driven front roller 1,000 millimeters (3 feet 3 inches) in diameter and 1,000 millimeters (3 feet 3 inches) wide, and two rear driving rollers 1,600 millimeters (5 feet 3 inches) in diameter and 500 millimeters (1 foot 8 inches) wide. To permit turning of the roller, the front roller is divided into two halves. The rollers revolve on cone roller bearings. The rims of the rollers are removable. Width of the strip rolled by the roller is 1,800 millimeters (5 feet 11 inches). Specific pressure of the front roller is 32 kilograms per one running centimeter (176 lbs. per linear inch) and for the back rollers is 68 kilograms per one running centimeter (374 lbs. per linear inch). The roller has three speeds (from 1.7 to 4.3 kilometers per hour or 1.06 to 2.7 mph.). Its radius of turn is 4,435 millimeters (14 feet 7 inches). The roller's average productivity is up to 4,000 square meters (4,784 square yards) in eight working hours.

For final rolling of asphalt-concrete surfaces, Soviet factories are producing the three-roll, self-propelled Model D-178B roller weighing 12 to 15 metric tons (13 to 15 tons). This roller assures an even layer of surfacing and an excellent-quality road. The machine has hydraulic control.

The Model D-178B roller is an ideal, high-output machine. The working parts are hollow steel rollers. The driving roller, which is 1,600 millimeters (5 feet 3 inches) in diameter, consists of two connected sections. Each of the driven rollers, which are 1,300 millimeters (4 feet 3 inches) in diameter, also consists of two sections sitting on one axle and rotating independently. Width of the strip rolled by the roller is 1,300 millimeters (4 feet 3 inches). Specific pressure (with ballast) of the driving roller is 69.9 kilograms per one running centimeter (384 lbs. per linear inch). For the driven rollers the specific pressure is 36.1 kilograms per running centimeter (198 lbs. per linear inch). Working speed of the roller is 3.5 kilometers per hour (2.2 mph), and the transit speed is 7 kilometers per hour (4.3 mph). Radius of turn is 4,300 millimeters (14 feet 1 inch). The roller's productivity is up to 5,000 square meters (5,980 square yards) per eight-hour shift.

Among the machines of this type, the two-roller, 10 to 12 ton Model D-178A should be mentioned. It differs from the Model D-178B in its somewhat smaller size.

Blacktop paving rigs

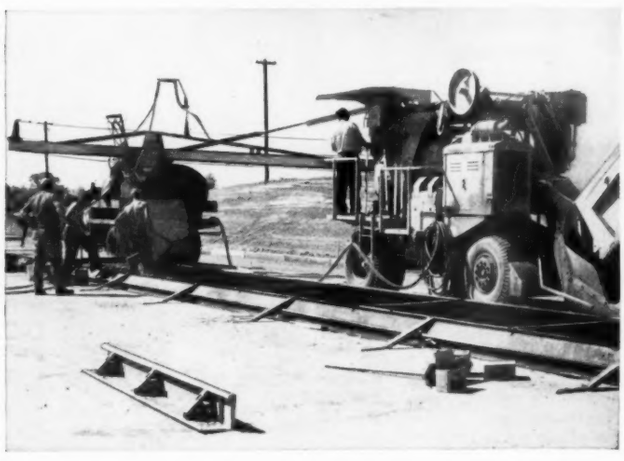
Machines manufactured in the Soviet Union for construction of black asphalt-concrete roads and surfaces

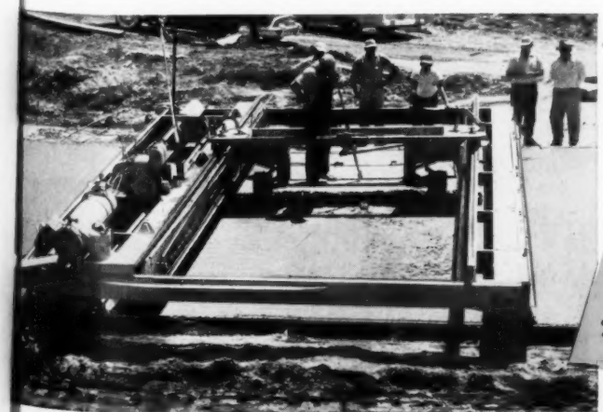
34-E *twinbatch* team works side-by-side on big U. S. airbase

Widening runways on a military airstrip, contractor completed job "on the double" with a pair of big Koehring 34-E *twinbatch* pavers. Notice how one long-boom 34-E poured the outside half, while the other poured the inside half of the strip. For balanced, high rate of production at *both ends* of the job, many contractors team up *twinbatch* pavers with C. S. Johnson automatic batch plants (another Koehring product worth checking). Clamshell cranes, finishers also available in big Koehring paving "package".

Mobile 16-E paves center-strips, intersections, bridge-approaches

On street and highway jobs, there's always extra concrete to be laid in addition to the main slab, such as curbs, gutters, center-strips, scattered intersections, approaches to driveways, bridges and side-roads. Consider the time-saving flexibility you can get with a rubber-tired *twinbatch* in your paving spread. This Koehring 16-E is as mobile as your batch trucks — can get back on the new slab *in as little as* 7 days to do clean-up work, or pave adjoining strips. Also has high elevated discharge, pours into overhead hoppers, forms, chutes. You'll find its usefulness unlimited as a utility unit . . . or as a general-purpose paver.





"Timely" precision-finishing —

is important on every paving job. Operating at almost twice the speed of a 34-E paver, Koehring Longitudinal Finisher handles all practical consistencies of concrete — harsh, wet or dry — produces smooth, mechanically-accurate slab with uniform crown transitions.

KOEHRING Company

Milwaukee 16, Wisconsin

Subsidiaries and divisions: JOHNSON • PARSONS • KWIK-MIX • KOEHRING OF CALIF. • BUFFALO SPRINGFIELD • KOEHRING-WATEROUS LTD. • HYDRAULIC PRESS

K769

For more facts, use Reader-Reply Card opposite page 18 and circle No. 360

are in wide demand. Among these should be mentioned:

The Model A-225 dismountable asphalt-concrete mixer. The machine is easily carried on trucks, heavy trailers, or railroad flatcars. It has a maximum productivity of 10 metric tons (11 tons) per hour and provides mechanized preparation in hot form of various asphalt-concrete and other blacktop mixtures for road construction. The machine is characterized by economy of operation. It uses only 7.6 to 8.5 kilograms (17 to 19 pounds) of liquid fuel per metric ton (1 ton) mixture produced.

The self-propelled Model D-150A asphalt layer for even distribution of asphalt-concrete mixtures on prepared bases. This model asphalt layer does a full cycle of work: receiving the mixture from a dump truck into its bunker (maximum capacity 5,000 kilograms or 11,000 lbs.) without stopping the laying process, feeding the mixture from the bunker to distributing worm conveyors, spreading the mixture the width of the strip being laid (a maximum of 3,630 millimeters or 11 feet 11 inches), smoothing out and preliminary packing of the mixture with a tamping block (which makes 1,400 to 1,500 strokes per minute), and finishing the surface with a smoothing plate with a regulated pressure from 0.1 to 1.25 kilograms per square centimeter (0.14 to 1¾ lbs. per square inch). To lay the mixture in cold weather, the smoothing plate is equipped with a special heating device. All the mechanisms on the asphalt layer are activated by a 40-horsepower U-5MA engine. The D-150A asphalt layer is mounted on crawler treads. It has six working speeds forward and three reverse working speeds.

Productivity of the layer is up to 100 metric tons (110 tons) of mixture per hour. Control of the working parts is hydraulic, and control of the crawler treads and feeder is by foot lever. The entire control system is grouped around the operator.

The self-propelled Model D-251 automatic road oiler mounted on the chassis of a ZIS-150 truck and used to transport and pour (under pressure) liquid bituminous materials in hot or cold form for roadbuilding and repairing. The vehicle consists of a distributing system (a D-171 asphalt pump with a productivity of 400 liters (106 gallons) per minute at a pressure head of 6 atmospheres (88 psi), pipelines, and distributors), a tank with a 3,600-liter capacity (951 gallons), a heating system, control levers, and control measuring apparatus. Width of the strip of the poured materials is up to 7 meters (8 yards). Average productivity is 22 metric tons (24 tons) per eight-hour day.

In the design and production technology of road machinery in the U.S.S.R., these things are provided for: extensive standardization of assemblies and parts; manufacture of working parts and of all vital parts of high-quality, wear-resistant, alloy steels; careful heat and mechanical treatment of parts and precision in their production; and high-quality assembly of parts. Faithful fulfillment of these requirements assures operational reliability of the machines and long life.

Road machinery of all types and models for both domestic and foreign customers is delivered complete with spare parts and instruments. Additional spare parts are delivered upon the first request by the customer.

THE END

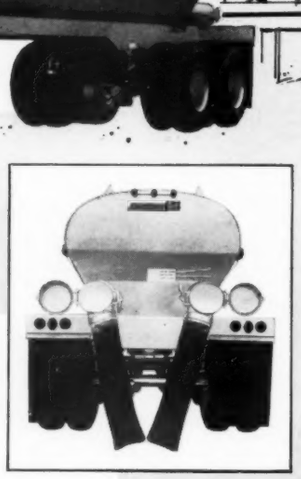
Piston, cylinder liners

■ "Hard Work Wanted" is the name of a booklet, from the Caterpillar Tractor Co., that explains the manufacture of pistons and cylinder liners. The booklet is illustrated with photographs of the machine and inspection operations performed on the engine parts during their manufacture. Included are explanations of the design and manufacturing standards met by Cat pistons, pins, rings, and liners.

To obtain this booklet write to the Caterpillar Tractor Co., Peoria, Ill., or use the Request Card that is bound in at page 18 of this issue. Circle No. 36.

the newest in
DRY-BULK HAULING!

HIGHWAY'S dry bulker features new, lightweight design plus fast, one-man unloading!



Here's Highway's new frameless Dry-Bulk Trailer that has been redesigned for three-way superiority. Lighter in weight for top payload profits . . . extra-rugged in construction for operating economy and long years of trouble-free service . . . and streamlined in design for improved appearance.

The Model 22 Dry-Bulk Trailer can be unloaded from any angle, on any slope. No special ramps, unloading facilities, hoists or winches are ever necessary. Interior is thoroughly cleaned by screw conveyors powered by a completely self-contained enclosed engine. Dual outlets with rubberized discharge boots have individual controls at rear-curbside. Manholes are easily accessible both by front ladder or rear steps.

The body of the Model 22 is made of hi-tensile steel — in capacities to meet your requirements. Highway Dry-Bulk features have proven themselves in on-the-job performance. This new Model 22 Dry-Bulk Trailer brings Highway's advanced design another step ahead of the field.

HIGHWAY TRAILERS

A Division of the Equipment Department, Harnischfeger & Scott Corp.

With Highway Trailers . . . the most important feature is PERFORMANCE!

HIGHWAY TRAILER COMPANY

HEADQUARTERS: EDGERTON, WISCONSIN

MANUFACTURERS OF: Commercial Trailers • Trailerized Tanks and Dry Bulk Haulers • Public Utility Bodies • Earth-Boring Machines • Pole and Cable Reel Trailers • Winches • Power Take-Offs • Service Accessories

SALES AND SERVICE IN PRINCIPAL CITIES

For more facts, use Reader-Reply Card opposite page 18 and circle No. 361

BUY BIG ORANGE AND YOU BUY THE BEST

Shackle Chain HOOKS

Use on "HIGH TEST" Chain

EXTRA STRONG

Even the pin is made of hi-strength steel and heat-treated

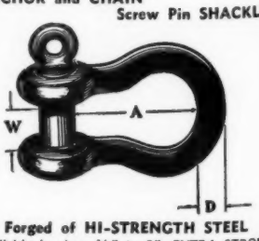
SAVES TIME

Can be attached anywhere on the job. Only a pair of pliers needed.

GRAB HOOKS Available for Chain Sizes ¼" 5/16", ⅜" 7/16", ½", ⅝".

SLIP HOOKS Available for Chain Sizes ¼" 5/16", ⅜" and ½"

ANCHOR and CHAIN Screw Pin SHACKLES



Forged of HI-STRENGTH STEEL

Available in sizes ¼" to 2". EXTRA STRONG —EXTRA TOUGH. Self-colored or galvanized Order from your Distributor or Write

MIDLAND INDUSTRIES, INC.

Cedar Rapids, Iowa

For more facts, circle No. 362

As a carrier-mounted unit, the Model 30-B can take booms up to 130 feet long—110 feet with a 30-foot jib. It is rated at 35 tons and has an independent boom hoist as standard equipment.

One-yard crane-excavator has capacity of 35 tons

■ A new crane-excavator in the one-yard class is announced by the Bucyrus-Erie Co. Named the Model 30-B, it is readily convertible to shovel, dragline, clamshell, crane, or drag-shovel.

The new rig is offered with five sizes of crawler mountings and as a carrier-mounted unit. It is rated at 35 tons. The main operating functions of the machine are air-controlled. These functions include hoist clutch, crowd and retract or drag clutches, swing and propel clutches, steering jaw clutches, digging brakes, swing brake, and dipper trip.

The 30-B is available with a diesel engine and either direct or torque-converter drive; with a gasoline engine and direct drive; or with an electric motor. The transit model is offered with a gasoline engine and direct drive as standard equipment; a diesel engine with direct or torque-converter drive is optional.

As a crane, the 30-B crawler can handle a boom up to 100 feet long plus a 10, 20, or 30-foot jib. The transit model takes a boom up to 130 feet long or 110 feet with a 30-foot jib. The boom hoist operates independently of all other functions. Boom suspension can be 8-part continuous or pendant type. The pendant type, with mast, is used on all booms longer than 60 feet.

Available as extra equipment for the 30-B are independent propel, a third drum and cat head that can be used with either standard propel or independent propel; and a hoist-load lowering control, which can be obtained for the crane, dragline, and clamshell. The hoist-load lowering control is standard equipment on the transit crane.

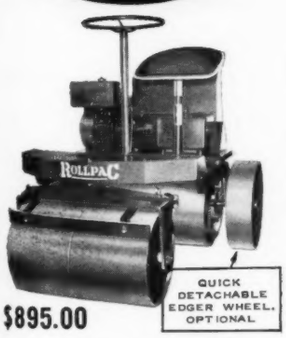
For further information write to the Bucyrus-Erie Co., South Milwaukee, Wis., or use the Request Card at page 18. Circle No. 73.

BPR field offices have final authority on highways

To speed up the nation's highway program, John A. Volpe announced a major transfer of operating authority from Washington to the field offices of the Bureau of Public Roads.

Under the new directive, the BPR's district offices will take final action on the detailed location of the highways; on all matters relating to the location of the primary and secondary highway systems; on all specific projects proposed by the states; and in the formal agreement between the states and government.

THE ROLLPAC



QUICK DETACHABLE EDGER WHEEL, OPTIONAL

$895.00

A Standout One Ton Roller in worldwide use by Contractors, Paving Engineers and Institutions.

Ask To See It.

ROLCOR Industries
1208 2nd Ave. So. Minneapolis 3, Minn.

For more facts, circle No. 363

How to meet density specs { in fewer passes / at less cost

Use the BUFFALO-SPRINGFIELD K-45 KOMPACTOR

CLAY ON PLANT SITE—One of 3 KOMPACTORS compacting nearly 90 acres of clay with some sand and some muck pockets on a plant site near Novi, Michigan. The contractor said that the KOMPACTORS were the only machines that would do a satisfactory job of compacting the clay found on this particular job.

CLOSE TO CULVERTS—The K-45 eliminates hand tamping on culverts such as this. On this one contract, 6 concrete box culverts in 12,726 miles of highway made close compaction a necessity. The KOMPACTOR also averaged 1100 yds. an hour on banked material—due to faster speeds and more uniform compaction, replaced other equipment.

"AN INSIDE JOB"—What other piece of compaction equipment could go inside the building and work right up to the walls? This self-propelled, reversible, highly maneuverable K-45 KOMPACTOR is compacting the earthen sub-base over which the cement floor will be laid. No hand tamping required—time and labor costs greatly reduced.

THIS K-45 worked at speeds of 5 to 6 mph compacting fill fast on a Texas airport construction job. There was no difficulty in meeting 100% density specification . . . only 2 to 4 passes by the big, self-propelled, 32,000 lb. K-45 were required. The contractor attained 500 to 600 cubic yards compaction per hour.

SAVES AN OPERATION—One entire operation, running coral rock through a crusher for base material, was saved by the K-45 on a Florida air base job. The self-propelled KOMPACTOR followed a tractor and a rooter to meet density specifications. Such highly efficient operation is another reason for the K-45's wide-spread popularity.

"TURNS ON A DIME!"—comparatively. Because the K-45 KOMPACTOR is self-propelled and operates at fast speeds of 5 to 6 miles an hour either forward or backward with equal ease, it is highly maneuverable. Its turning radius can't be matched even remotely by tractor-drawn compaction equipment. Saves time. All compaction is downward.

RECORD COMPACTION time in meeting density specifications on a $1,736,000 California highway construction job resulted from use of this KOMPACTOR. Just what quick results were obtained are shown graphically by the two unretouched photos of the soil (right). The first soil photo shows the material, before compaction, on the Ventura-Ojai, California road project. The second photo shows identically the same area after just 3 passes by the K-45 KOMPACTOR. (The pack of cigarettes in both photos is the same—see circles—and is shown for comparative size.) Fast speeds of 4 to 5 miles per hour by the self-propelled K-45 were maintained on this job.

● The K-45's "Interrupted Pressure Principle" of compaction does a better, more uniform job—provides minimum displacement of loose materials either forward or sideways—directs *all* compaction effort downward—requires *fewer* passes.

BUFFALO-SPRINGFIELD
Roller Division-Koehring Company
SPRINGFIELD, OHIO

Write today for full information, or see your nearest Buffalo-Springfield distributor.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 364

depend on dependable
McGOWAN
LIGHT and HEAVY-DUTY Pumps

COMPLETE CAPACITY RANGE TO HANDLE EVERY JOB

- Plumbing
- Waterworks
- Road Building
- Street Repairs
- Public Utilities
- Dredging, etc.
- Diversion of Waterflow

Fast, Positive, Built-in AUTOMATIC RE-PRIMING

Model 4 M
1½"

LIGHTWEIGHT PORTABLE

Solves troublesome job-site problems. Non-clogging, high efficiency impeller design for tough pumping conditions.

Write today for name of your nearest distributor . . . get complete details!

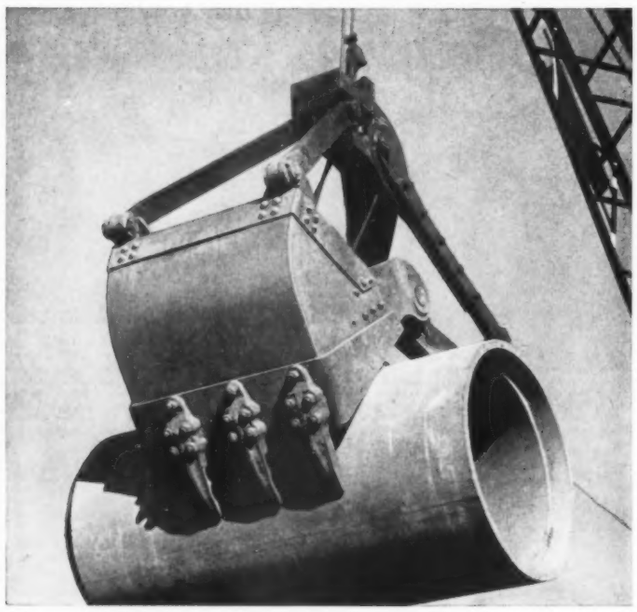
McGOWAN PUMPS Dependable Pumps Since 1852

DIVISION of LEYMAN MANUFACTURING CORP., 58 Central Ave., Cincinnati 2, Ohio

For more facts, use Reader-Reply Card opposite page 18 and circle No. 401

"OUR ERIE STRAYER BUCKET IS THE MOST VERSATILE TOOL WE OWN"

● States Edward J. Petrillo, President, Edward J. Petrillo, Inc.



On the job photo shows an ERIE bucket's no-slip grip on concrete pipe being moved at Edward J. Petrillo, Inc. on the New York Thruway.

The change-over from clamshell bucket to grappling hook costs time and money—to say nothing of the extra man needed to work the hook. That's where an ERIE bucket's versatility pays extra dividends.

Like Mr. Petrillo, many satisfied owners use their ERIE not just to dig and load sand and gravel, but to move boulders, sewer pipe, steel girders, concrete slabs, logs, and old lumber.

An ERIE Strayer bucket is nimble, too. Its great power is perfectly balanced and easily controlled. Operators appreciate this feature—especially when digging in corners, along edges or loading hoppers in tight quarters.

These better buckets provide these *"wanted"* features:

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Manganese steel teeth and high carbon steel lips that bite up full payloads of even toughest clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low head room for fast work in tight quarters; low center of gravity for easy positioning.

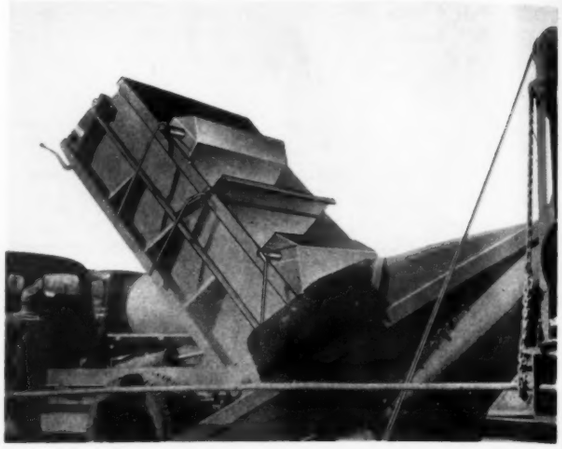
ERIE BUCKETS THE WORLD OVER

For catalogs, write Dept. CE27

ERIE STRAYER CO.

3227 GEIST ROAD ● ERIE, PENNSYLVANIA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 365



Sioux City cement boxes and companion dividers are said to fit most standard dump truck bodies. Each box has a 13-cubic-foot capacity.

Cement box fits most standard dump bodies

■ A new type of cement box for batching operations is available from the Sioux City Foundry & Boiler Co. The steel box, along with its companion divider board, is designed to fit most standard dump truck bodies. It holds 13 cubic feet of cement.

Hinged covers open and close the box with a positive linkage action. The divider board is raised and lowered by means of an offset handle. The box measures 14×27×60 inches. The divider is made of 3/16-inch steel plate and measures 36×78 inches.

For further information write to the Sioux City Foundry & Boiler Mfg. Co., E. 8th and Division Sts., Sioux City 2, Iowa, or use the Request Card at page 18. Circle No. 77.

Lubricating equipment described in literature

■ A catalog illustrating and describing complete portable field lubricating equipment built for use by contractors is available from Gray Co., Inc. The catalog details the Graco Convoy Luber, available as a ready-to-operate unit or as a "job-planned" field lubricator that can be assembled to fit the contractor's particular requirements.

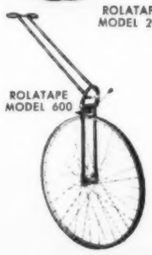
Diagrams and a complete bill of materials aid the contractor in step-by-step planning of his field lubricator. The "job-planned" unit can be assembled by the contractor's own mechanics or by the manufacturer if desired.

The Graco Convoy Lubers are complete with dispensing reels, hoses, pumps, and air compressors. They are mounted on steel frames with hardwood skids for easy placement on truck beds. Also shown is a complete line of lubrication accessory equipment.

To obtain this catalog write to Gray Co., Inc., 1059 Sibley St. N. E., Minneapolis 13, Minn., or use the Request Card that is bound in at page 18. Circle No. 63.

ROLATAPE MODEL 400

ROLATAPE MODEL 200


ROLATAPE MODEL 600

ROLATAPE is the Fast, Efficient, Economical, Modern way to measure. Model #400 is widely used by Road Construction Companies, Telephone Companies, Utilities, Sewage Departments and many other industries where measurements are important.

MEASURING time is cut to a fraction with Rolatape. Model #200 is extremely popular with Real Estate Men, Appraisers, Traffic Officers and many others who demand fast, accurate, measurements.

WHEELS on all Rolatapes are precision calibrated, and can be depended upon for long-life service. Model #600 is a special model for long-distance, acreage measuring and for use over rougher terrain.

FOR FAST, ACCURATE measuring—Rolatape Measuring Wheels are the answer. Models #400 and 600 measure distances up to nearly nineteen miles.

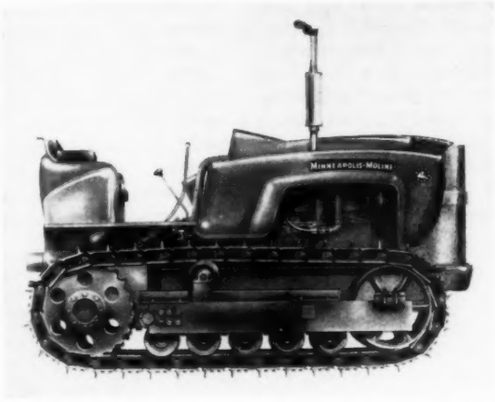
MEASURING is simple, time-saving, and efficient when you use a Rolatape. FOR COMPLETE DETAILED ROLATAPE INFORMATION, SEE YOUR DEALER, DISTRIBUTOR, OR WRITE TO:

ROLATAPE, INC.

Factory: 1741 Fourteenth Street, Santa Monica, California

For more facts, use Reader-Reply Card opposite page 18 and circle No. 366

First of new tractor line is 57 engine-brake-hp rig



The first of a new line of crawler tractors announced by the Minneapolis-Moline Co. is the 57 engine-brake-horsepower Golden Kat, featuring a 5-speed sliding gear transmission and, optionally, a torque converter in conjunction with a reverse shuttle gear.

■ The first of a new line of crawler tractors, in the 57 engine-brake-horsepower class, is announced by the Minneapolis-Moline Co. The Golden Kat has a 5-speed sliding gear transmission and, optionally, a torque converter working in conjunction with a reverse shuttle gear.

The first of the new line is powered by MM's new 206-cubic-inch, high turbulence, valve-in-head engine. The power plant features removable cylinder heads and blocks cast in pairs, rigid single unit crankcase and base pan construction, and removable side cover for easy access when servicing.

Standard equipment includes a spring-loaded foot-actuated clutch. Available optionally is a 13-inch cast-aluminum heavy-duty single-stage torque converter in place of the clutch. The converter has a 3 to 1 torque multiplication. Offered optionally with the converter is the reverse shuttle, which incorporates multiple-disk clutches running in oil and is hydraulically actuated. The shuttle incorporates a neutral to permit ease of shifting the sliding gear transmission

Tracks for the Golden Kat are available in 10, 12, and 14-inch widths with 42 or 52-inch treads. Two sizes of tracks, 4 and 5-roller, are offered. A wide range of shoes to fit the requirements of variable conditions are available.

For further information write to the Minneapolis-Moline Co., Box 1050, Minneapolis 1, Minn., or use the Request Card at page 18. Circle No. 71.

For more facts, circle No. 368→

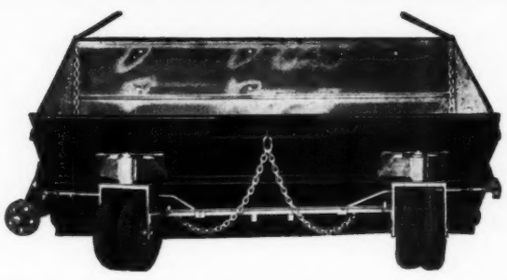
Electrically-driven pump will discharge 1,440 gph

■ An electrically-driven close-coupled pump that discharges 1,440 gph at a 24-foot head has been added to the self-priming centrifugal pump line of the Barnes Mfg. Co. The new pump is called the Model 1MAE.

The unit is direct-connected to a ⅓-hp 115-volt 60-cycle split-phase motor that delivers 3,450 rpm. A balanced angle grip on top of the pump makes it highly portable. The discharge outlet is designed for use with a standard garden hose.

For further information write to the Barnes Mfg. Co., N. Main St., Mansfield, Ohio, or use the Request Card that is bound in at page 18. Circle No. 65.

OVERMAN STONE AND BITUMINOUS SPREADER



IMPROVED . . . This all-purpose, low cost spreader is now equipped with pneumatic tires, providing easier steering and moveability, and eliminating vibration and road shocks when towing.

If this spreader is not part of your paving equipment, investigate at once. It's the most efficient, easiest operating paver available, and it's low price will surprise you.

WRITE FOR BULLETIN TODAY

I. J. Overman Mfg. Co.
BOX 896 MARION, IND.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 367

For every size job For every type equipment

MARTIN Trailers make money on every move:

"Folding Gooseneck" Trailer

Tow-type Trailer

Rear Loading Trailer

Tilting Platform Trailer

Big or small, low-traction rollers or big crawlers, whatever your equipment may be, there's a Martin Trailer designed to put it on your job faster, cheaper, safer!

You have a complete line of popular capacity trailers to choose from. These include the exclusive Martin patented "Folding Gooseneck" Trailers, Rear Loading Trailers, arched gooseneck trailers, over-the-wheels and between-the-wheels tilting platform trailers, tow-type trailers, and many others.

Every Martin Trailer is built to cut loading time—give more machine work time. Martin Trailers are built for everyday rough and tough hauling. They are fabricated from special high-strength steel throughout for great resistance to torque, stress, road shock and vibration. See your Martin-Caterpillar Dealer for the trailer matched to your equipment.

MARTIN MACHINE COMPANY, Kewanee, Illinois
MARTIN PACIFIC TRAILERS INC., Pomona, Calif.

MARTIN Trailers

labor review

Some drastic changes in hours of employment will have to be made to provide jobs for the millions of additional workers who will be entering the national work force during the next 10 years, according to a 63-page report prepared by the Public Affairs Institute, a private research organization in Washington, D. C. The study includes 14 tables and 20 charts which project employment to 1965 in construction, services, mining, trade, and 20 manufacturing industries.

If the gross national product continues to advance at the present rate, the PAI report states, newcomers to the labor force could be absorbed only by a four-hour cut in the work week or by the addition of five extra weeks of vacation. The present rate of increase of the gross national product is 3¼ per cent annually. If the nation's output were to increase annually at the rate of 5 per cent, the report added, it would require a weekly reduction of 1½ hours or an increase in vacation time of 1.8 weeks.

Other points made by the report are:

1. Major cuts in working hours between 1948 and 1955 were avoided because of the sharp rise in government employment. This absorbed 48 per cent of the labor force growth during the period.

2. The labor force is expected to increase by 9.4 million during the 10-year period ending in 1965, reflecting the increased birth rate of the 1940's. But job applicants in the nation's major industries will advance by 10.7 million as a result of the continuing shift of workers from farms to industry.

3. Continuation of past increases in productivity will bring about a reduction of 24 per cent in labor time per unit of output during the 10 years ending in 1965. Assuming an annual rate of advance in gross national product of 3¼ per cent, hours would have to be sliced 10 per cent to provide jobs for the new members of the labor force.

4. An increase in mechanization is not automatically followed by a like increase in employment. Only five fields have shown a more rapid increase in labor demand than in productivity.

For the first time in the history of the state, Kentucky has a highway and heavy-construction labor contract in effect. The agreement was negotiated between the teamsters, carpenters, and laborers on the one hand and the Associated General Contractors on the other, although firms signing the pact did so on an individual basis. The contract expires July 1, 1958.

According to a Louisville spokesman for the AGC, the agreement does not involve an immediate general wage increase for any of the unions. It lists existing wage scales, varying them in accordance with a zone system and bringing them in line with wages in the AGC's building contracts in the state. The pact, which covers more than 15,000 workers, does not carry fringe benefits, the spokesman said.

Five zones have been set up for the teamsters. Rates between zones vary up to 60 cents, with the highest zone paying $2.66 per hour. The laborers get between $1.75 and $2.55 per hour and are divided into nine zones. For both groups, a 12-cent-per-hour increase will go into force on July 1, 1957.

The wage rates of carpenters vary over four zones by up to $1.10, with the highest rate pegged at $3.45 per hour. Foremen get between $2.60 and $3.95, depending upon the zone. On July 1, rates will go up 15 cents per hour in 85 counties of the state and 10 cents per hour in 35 counties.

There were three major construction strikes during 1956, the Bureau of Labor Statistics reported in a compilation of disputes, each idling at least 10,000 workers last year. The longest, lasting 71 days, was the strike of 10,000 ironworkers last May in the New Orleans area. A walkout of 30,000 building tradesmen in northeastern Ohio ran for 27 days, and 13,000 carpenters in the San Francisco area were out 12 days.

11 rock-speeding PAYHAULER® TRUCKS star in seaway's biggest, single show!

8 other International® rigs help move 2,451,000 cu yd of rock and earth in $14½ million lock construction!

Eleven International "95" PAYHAULER trucks...because of their high speed, big pay-capacity and around-the-clock endurance...are playing the starring roles in the St. Lawrence Seaway's biggest, and perhaps toughest, single show!

The PAYHAULER units are sparking a demanding monthly production schedule of 120,000 yds of rock and 100,000 yds of common earth. The scene is United Waterways Constructor's $14½ million contract of the upper Beauharnois lock construction and channel excavation near Montreal, Quebec.

International TD-24 crawler tractors, TD-14 Skid Shovels, and a "75" PAYSCRAPER® are also vital producers in the moving of the total required 1,461,000 yds of rock and 990,000 yds of earth. Lock completion is scheduled for December, 1958.

PAYHAULER units have also been moving most of the rock on a lower Beauharnois lock. On a similar shorter-haul rock job in the midwest recently, two identical PAYHAULER units maintained a production average of 2,400 cu yds per day!...And here on the seaway, with average 4,000-foot one-way hauls, PAYHAULER units' high speed, next-to-automatic Torqmatic brake control, and minute-saving, easy-to-heap big capacity are cutting cycle time to a minimum and bringing home maximum loads as well.

The rugged PAYHAULER units on the seaway job are standing up to the toughest test in their spectacular career. They're working around the clock, 5 days per week, hauling mostly rock but also proving themselves in wet, job-fouling mud and on slippery, water-soaked lock floors.

Success on the seaway and on other tough jobs the country over is proving International PAYHAULER units to be what construction men themselves asked for...a big-capacity, high-speed hauler with low downtime and operating costs. See for yourself. Try an International PAYHAULER unit on your job.

TON-SIZED ROCKS go up...then down into fill in **MAXIMUM SHOV** 12 seconds. Two-stage hydraulic hoist provides full- ...nois lock constr time power control. Hydraulic snubbing assures ea... ...y-loading Inte center dumping, gentles body return. ...lts. High tensile ...m, super-duty "s ...me in "95's" cl

38 MPH SPEEDS keep three or four PAYHAULER units on haul road at all times. Hand-operated Torqmatic brake gives accurate control for safe, high-speed travel on congested haul roads. TD-24 tractor spreads rock for fill at railroad diversion.

INTERNATIONAL HARVESTER

The report on all strikes during 1956 shows that fewer workers were idled than in any postwar year except 1954. The number of strikes beginning in 1956 and the total man-days of idleness resulting from all work stoppages in effect during the year also were below a majority of the postwar years.

A review of contract settlements during 1956 shows that more than half of them establish contracts of two years or more duration. Just under 48 per cent of the nearly 600 settlements included call for—or are assumed to call for—new negotiations during 1957. The majority of the settlement that have been made —49 per cent of them—specify deferred increases which will go into effect automatically during the life of the contract.

In terms of cents per hour, negotiators preferred 15-cent initial increases by three to one. A 15-cent raise shows up in 27 per cent of the settlements on which specific wage information is available. Ten through 14-cent hikes are evident in 38 per cent of the settlements. Only 6 per cent call for initial increases of less than 10 cents and only 9 per cent exceed 20 cents per hour.

The most popular deferred increase in the long-term agreements is 10 cents, stipulated in about 33 per cent of the settlements. Seventeen per cent call for deferred raises of 12, 12½, or 13 cents per hour, and a like amount specify 15-cent boosts.

A round-up of wage settlements in New York State involving 50 or more construction workers during the first nine months of 1956 showed that the workers averaged over three cents per hour more in increases than the average for all industries combined. The average increase in the construction field was 13.4 cents, while for all industries it was 10.3 cents.

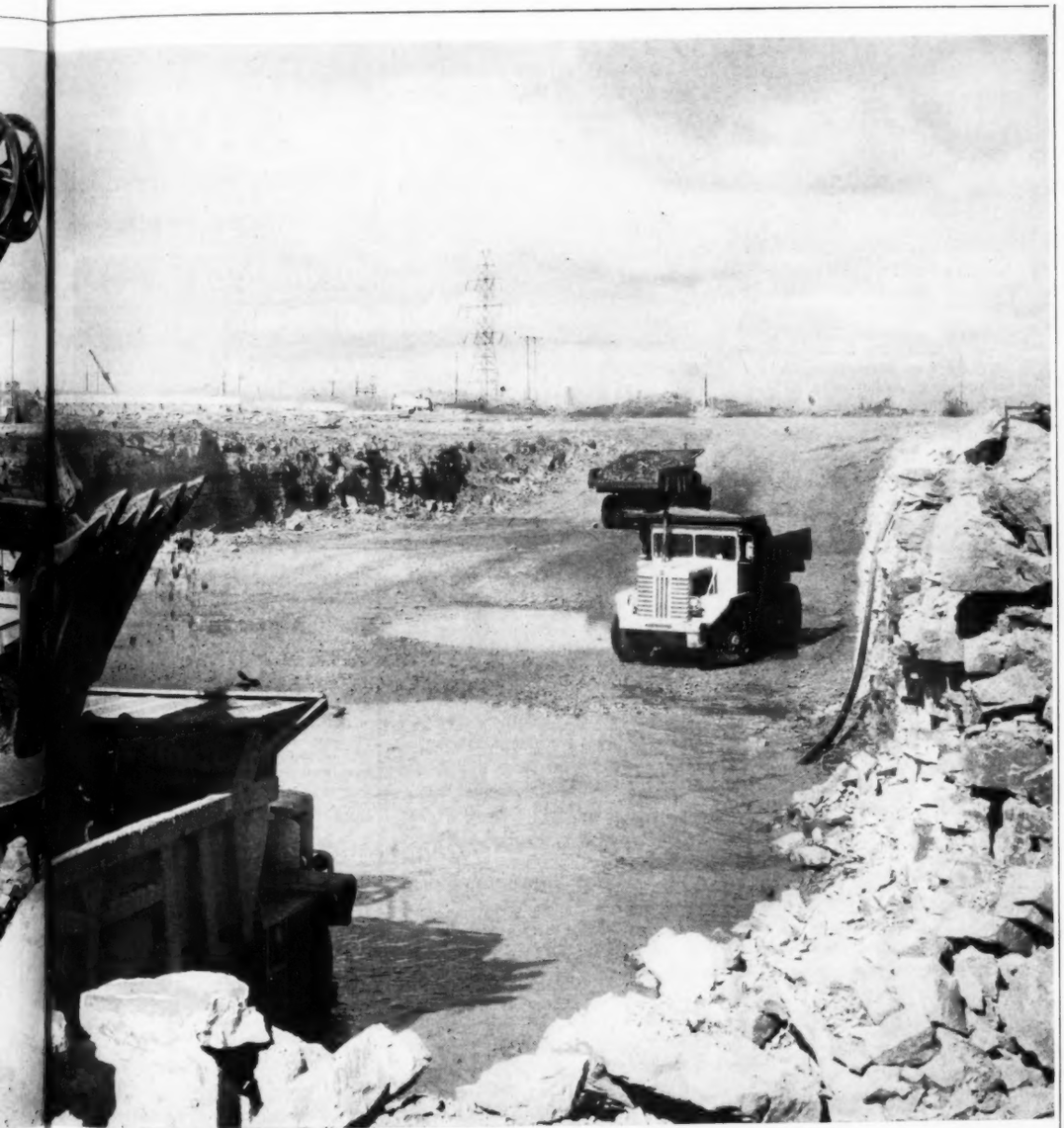
The average increase in terms of construction workers affected (determined by weighting each settlement by the number of workers covered and averaging the total) was nearly the same as the average settlement by contract, the survey showed, coming to 13.7 cents per hour. The construction figures are based on 168 settlements recorded by the New York State Department of Labor involving 117,585 workers.

In one of his last rulings before resigning as Attorney General of New York to assume his duties in Congress as a senator, Jacob Javits gave joint labor-management welfare and pension funds the green light to underwrite their own risks without running afoul of the state's insurance statutes, instead of having to depend on standard insurance companies. Javits ruled that the Taft Act's joint supervision requirement for newly instituted funds does not change the purpose of the funds —to provide benefits for union members.

The question was whether the Taft Act, by requiring joint trusteeship of new funds, cancelled provisions in the insurance laws exempting unions operating their own plans from tax, license, and other regulations which apply to commercial insurance companies. Javits reasoned that, since both types of funds serve the same purpose, the exemptions of the insurance laws apply to both.

The Spokane (Wash.) Building Trades Council has asked the United States Supreme Court to review the decision of the Supreme Court of the State of Washington which banned organizational picketing by a Washington carpenters' union. The state court's ruling was based on Washington's Labor Disputes Act, which sanctions "legitimate picket activity" when a "labor dispute" exists. The court decided that no labor dispute existed when the carpenters picketed a Washington building contractor because "no member of the picketing union is employed by the person whose premises are being picketed."

The Supreme Court has taken no action as yet in granting or denying a review of the case.



MAXIMUM SHOVEL OUTPUT on upper Beauharnois lock construction is maintained by fast, easy-loading International "95" PAYHAULER units. High tensile steel sides, triple section bottom, super-duty "spring cushions" plus strongest frame in "95's" class stand rock-shock!

Project length	5,000 feet
Width of lock excavation	60 to 150 feet
Depth of lock excavation	54 feet
Approximate use and disposal of excavated material:	
40,000 yd brown clay	dyke construction
400,000 yd earth	random fill
500,000 yd rock	aggregate plant
270,000 yd rock	structure fill
70,000 yd rock	railroad diversion
60,000 yd rock	yard areas, construction roads
15,000 yd rock	rip-rap and dykes
15,000 yd rock	service roads

INTERNATIONAL HARVESTER

INTERNATIONAL®
Construction Equipment

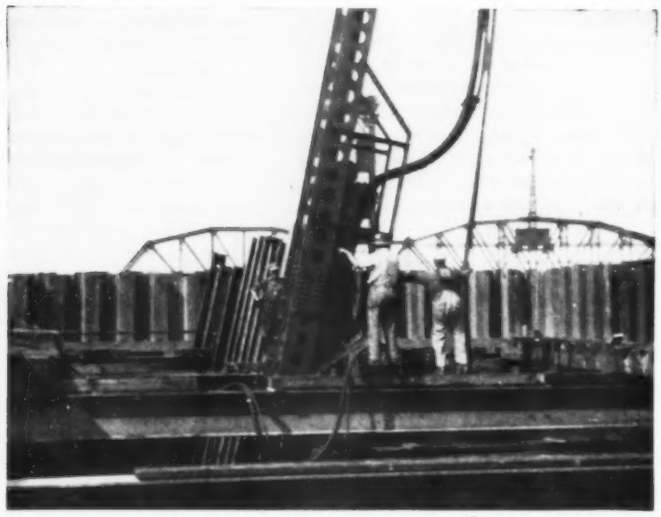
International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

←For more facts, circle No. 369

The new series of Transcrete T. E. D. (Truck Engine Drive) truck mixers features power for the mixer taken from the front of the engine, where truck speed or truck gear does not influence the amount of power. ►

(advertisement)



Driving one of the 2,568 H-beam 12-in. and 14-in. bearing piles for pier foundations of the 9,500-ft. bridge over Newark Bay on the new 8-mile expressway connecting the New Jersey Turnpike with the Holland Tunnel under the Hudson River to New York City. The piles ranged from 67 to 128 ft. long, and had to be driven with extreme accuracy through sticky soil to rock. To drive the piles, the contractor, Dravo Corporation, used 9B3 and 10B3 Double-Acting Pile Hammers and an S8 Single-Acting Pile Hammer manufactured by McKiernan-Terry Corporation, 82A Richards Ave., Dover, New Jersey.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 370

SPEED

HAIRLINE ACCURACY

1-MAN SHORE

ROOSHORS

EXTENSION TYPE

No other shore has had such universal acceptance as the Rooshor, Extension Type. A standard, adjustable Rooshor, the Rooshor, Extension Type, has a flat steel head for use under stringers or beams. For heights more than 14 ft., an S4S 4 x 4, of any length, may be inserted in the top of the Rooshor.

From coast to coast, and abroad, too, Rooshor is the accepted shore for speed, dependability and hairline accuracy. Its the labor you save that makes the difference . . . you save more labor with Rooshors.

PERFECT SQUARE EVERY TIME WITH ROOS COLUMN CLAMPS...

Two identical hinged units . . . no right or left, no wrong way to use them . . . that's the Roos Column Clamp. A hammer is the only tool needed for installing. Perfect squaring is assured.

MAIL COUPON TODAY

BAKER-ROOS, INC.
602 W. McCarty Street · P.O. Box 892
Indianapolis 6, Indiana

C&E 257

Please send additional information on Rooshors and Roos Column Clamps without obligation.

Name_____

Company_____

Address_____

City_____ State_____

For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 371

Truck mixers feature front engine drive

■ A new series of T. E. D. (Truck Engine Drive) Transcrete truck mixers is announced by the Construction Machinery Co. On the T. E. D. series, power to operate the mixer is taken from the front of the engine, the speed of which is subject only to throttle variation and has nothing to do with truck gear or truck speed. Therefore, the mixer runs well within the desired limits for all phases of operation.

The floating drive feature of the conventional Transcrete is also featured on the T. E. D. Transcrete. It automatically compensates for the reaction of the loaded drum and the flexing or abnormal movement of the truck frame, protecting the drum drive from the damaging loads inherent in truck mixer operation.

A power connector using multiple V-sheaves with five steel core V-belts further maintains the flexibility of design, the manufacturer states. A large-diameter driveshaft tubing contained in a flexibly-mounted center bearing is said to eliminate shaft vibration.

For further information write to the Construction Machinery Co., 447 Vinton St., Waterloo, Iowa, or use the Request Card that is bound in at page 18 of this issue. Circle No. 109.

Tubular screw conveyors

■ Portable and permanent tubular screw conveyors are described in a folder from the Andrews Machine Co. The units are recommended for concrete block plants, cement plants, and ready-mix operations.

Andrews conveyors are available in three series with capacities up to 4,895 cubic feet per hour. Hardiron, plain, lubricated, or plastic bearings are available depending on the application. The units are regularly manufactured in screw diameters of 6, 9, and 10 inches up to lengths of 60 feet. Special units can be built to order.

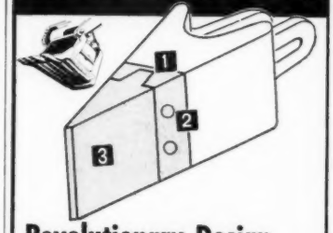
The folder gives complete details on the conveyor line and describes the Andrews P-51 portable overtrack attachment that teams with the conveyor to permit the unloading of covered hopper cars without the need of spotting the cars over pits dug under the track.

To obtain this folder write to the Andrews Machine Co., 359 E. Main St., Decatur, Ill., or use the Request Card at page 18. Circle No. 59.

NEW!

Bulldog Replaceable Digger Teeth

CUT INVENTORY AND REPLACEMENT TOOTH COSTS UP TO 65%



Revolutionary Design Has Just 3 Parts

1. *Universal Weld-On Adapter* uses old tooth as a base. Saves the cost of conventional adapter or new tooth. Same adapter fits on several different types of equipment. Easily welded on worn teeth.

2. *Positive Lock Pins* that give a tight fit to the replaceable tooth and are easily removed for replacement.

3. *Easy Change Replaceable Tooth, changed with a hammer and punch. Has reversible bevel point. Made of highest quality alloy steel — heat treated to outwear all other teeth. Field tested in taconite mines under toughest abrasive conditions, Bulldog Teeth have consistently shown cost savings up to 65%.**

YOU NEED ONLY A FEW ADAPTER SIZES TO FIT ALL POPULAR MAKES OF

Shovel Dippers · Dragline Buckets
Back Hoe Buckets · Clamshell Buckets
Loader Buckets

For descriptive folder, technical data, prices, and name of your nearest dealer—

**pat. pending* *Write Dept. CN-2*

Sales Representative and Distributor Inquiries Invited

ALLIED

STEEL & TRACTOR PRODUCTS, INC.

7835 Broadway Cleveland 5, O.

For more facts, circle No. 372

New rock-drilling crawler

■ A new rock-drilling crawler rig that is said to reduce drilling time by as much as 30 per cent is announced by the Thor Power Tool Co. The MM-2 Drillcat is a self-propelled one-man-operated unit consisting of a drill, a mast, and twin air motors.

A 105M drifter rock drill, a BW-2 wagon-drill mast, and a pair of 7½-hp reversible air motors make up the rig. The drill mast is raised and lowered by a hydraulic boom. It is equipped with centralized controls for drilling, feeding, and hole blowing at full line pressure. The mast also features adjustable chain tension and heavy-duty shock absorbers to protect both chain and mast from damage when the drifter is returned to the top of the mast.

The Drillcat performs the same vertical, horizontal, and angle rock-drilling operations as the Thor wagon drill. The crawler's extra heavy weight of 3,000 pounds lends added stability under all operating conditions. Its motor has sufficient power to tow an air compressor into drilling position.

Another feature of the 6½×6-foot rig is a heavy-duty steel centralizer for starting holes. A 5-hp rotary air motor operates a chain drive at infinitely variable feeds of from 2-inches-per-minute crawl to fast forward and return.

For further information write to the Thor Power Tool Co., 175 N. State St., Aurora, Ill., or use the Request Card at page 18. Circle No. 102.

The Thor Drillcat, a self-propelled one-man-operated rock drill mounted on air-powered crawlers, is said to speed operations as much as 30 per cent.

Bulk transport bodies

■ Bulk-cement transport bodies made by Baughman Mfg. Co., Inc., are described in a bulletin from the manufacturer. The bulletin covers the complete line of automatic self-unloading bodies.

Specifications, capacities and descriptions of 10 truck and trailer units are listed. Included are rigs that unload by means of augers, conveyors, and gravity. Gravity discharge is available in both side and bottom-dump rigs.

To obtain Form No. A-415 write to Baughman Mfg. Co., Inc., 192 Arch St., Jerseyville, Ill., or use the Request Card at page 18. Circle No. 47.

Thor sales zone manager

A service engineer for Thor Power Tool Co., Aurora, Ill., Martin A. Bertram, has been made manager of the firm's new Great Lakes electric tool sales zone.

This is the fourth such zone to be set up by Thor in the past year.

Pocket Size
COMPUTING MACHINE
"CURTA"

Field parties and job inspectors making frequent on-the-spot computations of the high degree of precision will be aided by a new pocket-size computing machine of the single-step drum type.

The 8-oz. "CURTA" model 1 an eight-digit number by a six-digit number and give an eleven-digit answer. Model 2 — 11 x 8 x 15 digits. Operating like a standard manual office machine, it can add, subtract, multiply, divide.

Model 1—$ 99.50 + $6.00 excise tax. Formerly $149.50

Model 2—$129.50 + $7.90 excise tax. Formerly $199.50

OPTICAL DOUBLE CENTER TRANSIT GEO T 50

with a patented new feature to prevent READING ERRORS. The horizontal circle shows a light green field (H), the vertical circle a white field of visure (V). The optical micrometer shows a white field of visure. Other Features: 100% faster work because of reading both circles from one position. The OPTICAL PLUMMET allows working under all weather conditions. ERECTING EYEPIECE, direct reading 1 minute, easy estimations 6 seconds.

GEO T 50 — $650.00 and tripod $50.00.

GEO T 20 — $680.00 and tripod $50.00, direct reading 20 seconds and estimation 2 seconds.

Write for catalog

GEO-OPTIC COMPANY, INC.
170 Broadway New York 38

For more facts, circle No. 373

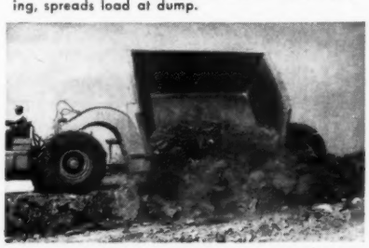
The Athey PR20-Cat DW20. Capacity 22.5 cu. yd. speeds up to 32.1 MPH for high-speed hauling.

The Athey PR15-Cat DW15. Hauls 22 tons of rock or other material at speeds to 31.3 MPH.

The Athey PR21-Cat DW21. 34 ton capacity, maneuverable for crowded areas. Standard or heated body.

ATHEY OFFERS YOU
the only COMPLETE and PROVED Trailer Line

The new Athey Hydraulic Ejection Trailer. Handles sticky, hard-to-discharge materials, controls dumping, spreads load at dump.



The Athey PD20-Cat DW20. Dumps on the go, speeds long haul jobs, capacity 31 tons at speeds up to 25.1 MPH.

For tough rock and earth jobs...

Whether it's big rock — gumbo clay — ore, mud or earth you have to move, there's an Athey Trailer to answer your material hauling problems. Athey is the leader in the trailer field and offers the only *complete* line of sizes and types of high-speed material handling trailers.

Each unit is built to rigid standards of quality construction that mean long life and low upkeep. Proven Athey design features are setting the pace for faster dumping, greater maneuverability, easier loading and higher production.

Select the exact size and features to gear your job for highest output. Depend on quality-built Athey Trailers powered by Caterpillar Wheel-Type Tractors. Ask your Athey-Caterpillar Dealer for information on "the complete line" today, or write direct to us. Athey Products Corporation, 5631 West 65th Street, Chicago 38, Illinois.

Athey

THE *Complete* TRAILER LINE... *by the Leader*

For more facts, use Reader-Reply Card opposite page 18 and circle No. 374

The H. P. Benson II drops another of the tetrapods at random along the facing of the breakwater at Kahului harbor. Instead of being about 25 feet aft, as is usual, the swivel hoist is at the bow to give the crane maximum lift and reach.

Total of 600 tetrapods, 13 feet high and weighing 33 tons, are mass-produced and set along breakwater in island harbor

New breakwater-facing method to have roughest test in Hawaii

The most severe test of a new technique for facing a harbor breakwater is taking place in the reef-bound harbor of Kahului at Maui Island in the Hawaiian group.

In this harbor, where the touch-and-go fight between man-made breakwaters and the mountainous rollers of the Pacific has been going on for more than half a century, U. S. Army engineers are banking on the tetrapod—a four-legged concrete bulk—to give man the victory in the fight against the sea.

Until now, the Pacific has been the winner in the fight that began with the construction of the original breakwater in 1905. Built to protect this important harbor where ships load sugar from island plantations, this breakwater had 100 feet of its seaward end wrecked almost as soon as the structure had been finished. An island railroad paid $165,000 to construct an arrow-shaped, 300-ton monolithic concrete tip for the breakwater, but this new construction was washed away by the first storm that arose. Since Kahului is navigable water, the federal government stepped in to place armor stones weighing 8 tons apiece in the breakwater. When these failed, 16-ton stones were tried. These, too, proved useless. Finally, in 1947, more than $500,000 was spent in repairing both ends, and the root and the center of the breakwater.

Tetrapods used

The latest job of protecting the breakwater, done under the direction of the U. S. Army Corps of Engineers, was the result of a design analysis and repair plan worked out after tests with models at the Corps' Waterways Experimental Station in Vicksburg, Miss.

The key to the success of the job lies with the tetrapod, originated several years ago by a French hydraulic laboratory. This four-legged structure has three cylindrical legs that taper down from a center body or core to dig securely into the sea floor much the same as the flukes of an anchor. The structures vary from 10 to 33 tons in weight and from 7 to 13 feet in height.

Development of "pods"

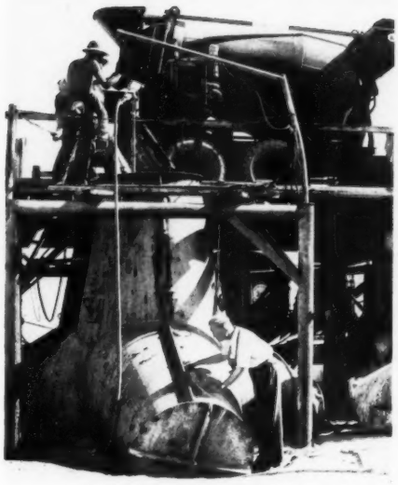
The tetrapods were developed by the Laboratoire Dauphinois d'Hydraulique, which was commissioned by European engineers to conduct

1957 February 1957
"Break in the New Year with a better block"
Cut away shows how recess in "speed nut" encircles boss on side plate when in closed position, giving absolutely safe, sure closure.
McKISSICK
SPEED NUT
SNATCH BLOCK
Is quick and safe
Eliminates all lower bolts facilitating easy opening and closing.
Two quick turns of "speed nut" and block is ready to open or close.
"Speed nut" is never completely removed and cannot be lost.
A BETTER BLOCK FOR EVERY PURPOSE
McKISSICK
McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

For more facts, use Reader-Reply Card opposite page 18 and circle No. 375

Power Plants Speed Construction
USE POWER TOOLS—FLOOD LIGHTS
WINPOWER PORTABLE ELECTRIC PLANTS
provide a dependable, low cost power source . . . speed up work performance by operating time and labor saving power tools. Wherever the job—whatever the need—you can count on a WINPOWER Electric Plant to meet your requirements.
A Different Size For Every Need
800 WATTS To 100 KW
All Standard Phases and Voltages
These rugged, heavy-duty 3-wheel dollies are used as a permanent mounting for 3, 4, and 5 KW electric plants where portability is desired by contractors, bridge builders, mine operators, road constructors, railroads, cities and municipalities.
Trailer-Mounted Floodlight Unit
MAKE NIGHT HOURS PAY with NITE-HAWK
Four 80,000 c.p. flood lights raise to 8½ ft.—aim in all directions. Control panel has duplex receptacles for extension light and power tool lines—voltage regulator—circuit breakers—fused circuits.
Tows at highway speeds on heavy-duty trailer with leaf springs—retractable caster wheel. This is the finest, most flexible unit available. 5 KW, 115 or 230 Volt.
Powered by Wisconsin 4 cylinder, air-cooled engine
WRITE FOR LITERATURE AND PRICES
WINPOWER MFG. CO.
Dept.
Newton, Iowa

For more facts, use Reader-Reply Card opposite page 18 and circle No. 376



The 13-foot-high and 33-ton tetrapods are produced six at a time by forms built by Hawaiian Dredging Co. The Rex Moto-Mixer drives up a ramp to chute concrete from the platform to the top of the forms.

a series of research studies on the problem of building structures more capable of resisting the battering of the open sea.

Such structures—and particularly the rubble-mound-type breakwaters protected by a revetment of heavy blocks—are difficult and expensive to build, yet do not satisfactorily resist wave force. The mass and surface of these breakwaters have to be large enough to provide a slope that will hold back the sea. Yet this slope must be strong enough to resist the force of the water and protect the core of the breakwater.

Difficulties arise when blocks are laid flush with one another on a breakwater slope, for if the surface incline is too gentle, waves top the structure. If the incline is too steep, the surface takes the straight pounding force of the ocean. In the former case, the breakwater itself is of little use; in the latter case the structure can be expected to break up.

Back, or under pressure, long troublesome in flush-laid facing, was minimized after the practice of beveling the edges of the blocks had been adopted. This had the effect of providing some dispersion of the water.

But this was the only major advance in actually designing blocks for breakwaters. Artificial blocks were manufactured for large breakwaters when big rocks were not available locally. But though the size and weight of these blocks has increased as larger breakwaters were built, their shape remained unchanged. These blocks take second place when compared with natural facing material of similar density and weight, inclined at the same slope and exposed to the same waves.

Advantages over rock

Concentrating on developing a shape that was hydraulically effective, the French laboratory, using modern

(Continued on next page)

no problem to winter patching with-

KOTAL STOCKPILE MIX

EASY TO WORK WITH . . . ALWAYS AVAILABLE

Some exclusive franchises still available. Write for details.

For Roads that take extra beatings and must last longer—for roads that need extra attention during freezing and thawing—use KOTAL STOCKPILE MIXES . . . they work better and last longer . . . Repairs are quick and easy to make in all kinds of weather. KOTAL STOCKPILE MIX is tougher, more durable and does not "kick out" under heavy traffic . . . A must for good highway maintenance.

KOTAL IS A SPECIFICATION MIX IN MANY STATES

ECONOMICAL—SAVES TIME, LABOR AND MATERIAL

WRITE for bulletin 101-A entitled "Paving with Longer Life." No cost or obligation.

Patches made with KOTAL STOCKPILE MIX eliminates the need for repatching. One KOTAL Patch does the job right — it's permanent!

KOTAL Company

360 SPRINGFIELD AVE. • SUMMIT, N. J.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 378

ALL-NEW MASTER TURN-A-TROWEL HAS POWER BLADE ADJUSTMENT

"This sure beats workin' ", said one operator after he'd tried the all-new Master "Powermatic" 34" trowel. "I've never had it so easy in my life . . . or done a better job."

No wonder he likes it. He pushes or pulls a knob and *engine power* tilts the combination blades to float or finish.

Know what that means? He gets exactly the job he wants, faster and easier.

He doesn't have to "fight" this trowel, either. The Master's only 14" from the slab to the *top* of the engine . . . has the *lowest center of gravity* of any power trowel. Wobble's a thing of the past. And the direct drive puts *all* the engine's power to work.

You'll like the all-new Master, too. The *automatic* clutch that let's the Briggs & Stratton engine get to operating speed before engaging the blades. The "dead man" control that *idles* the engine when you let go the handle. The stationary guard ring. They all make troweling easier and better.

The all-new Master in 34" gasoline-drive is now ready. Three or four blades, whichever you prefer. *Power blade-adjustment, direct drive, lowest center of gravity* and other new features make it your best buy. You'll like it. See it at your distributors or write us for full details.

MASTER MASTER VIBRATOR COMPANY
609 Stanley Avenue, Dayton 1, Ohio

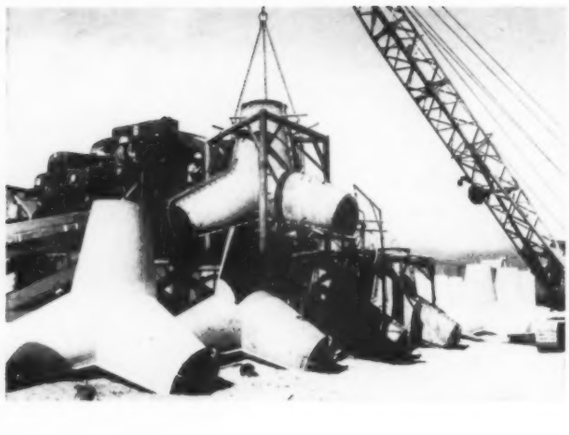
For more facts, use Reader-Reply Card opposite page 18 and circle No. 379

Buy MADESCO, and you benefit by over thirty years specialized experience in designing blocks for countless specialized needs. Available with heavy steel (or wood) shells, heavy fittings, plus iron or steel graphite bronze, self-lubricating sheaves, bronze or antifriction bearings. Madesco features sum up to safe, fast lifting, longer rope-life, trouble-free service. Consult your distributor for standard blocks for delivery from stock . . . and meantime write for our complete catalog. Special engineering services and recommendations also available.

MADESCO TACKLE BLOCK CO., Easton, Pa.

MADESCO BLOCKS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 377



The upper section of the forms are lifted off the tetrapods after a 5-day curing period. The base plate and end plates for the legs remain in place. The lift is made with a three point hookup to a pipe frame.

The heavy "pods" are carried from the casting site to the barge by a Tournacrane, modified by added wheels, an A-frame and a counterweight. This rig does away with the need for two cranes and low-bed trailers for the transportation job.

(*Continued from preceding page*)

experimental equipment, came up with the tetrapod as a new type of effective and economical facing material.

As the four-legged concrete tetrapod is laid at random along a breakwater slope, the cylindrical legs become interlocked, rather than forced apart, by the action of the sea. Since they have a very low center of gravity, this interlocking insures a high internal coefficient of friction in the revetment, providing stability even on steep slopes. The settling that results from severe storms only keys the tetrapods together stronger than before.

The tetrapods, because of their shape, form masses with a very high voids ratio. Since no flat surfaces are provided by the structures, they cannot form a continuous impermeable revetment such as that produced by rectangular or pyramidal blocks. Sea water passes to and from the porous interior of the breakwater, eliminating the underpressure that tends to lift impermeable facings at the instant when waves fall back.

The cylindrical protuberances of the tetrapods also produce a slope with enough roughness to dissipate wave energy so that overtopping, as well as agitation at the base of the breakwater, are reduced. The units may even be used on slopes ranging up to 45 degrees. This type of slope cuts down on the volume of material needed in the breakwater and permits a reduction in the unit weight of the tetrapods. Handling the tetrapods is easier on the steeper slopes, since the derrick or crane arms do not have to be as long as would be needed for breakwaters with long, gentle slopes.

Results on other jobs

Engineers have become optimistic about the ability of tetrapods to afford breakwaters protection from the sea. In their first test more than four years ago, 15-ton tetrapods were used to cover two moles protecting the seawater intake of a Moroccan steam power plant. The tetrapods, used after 50-ton blocks failed to stand up, are still in place.

Aside from the installation at Kahului harbor, the only tetrapod breakwater project in this part of the world is the Crescent City breakwater in Oregon. This job will require more than the 600 "pods" used at Kahului, but the units will be only about half the size of those used for the island job.

Tetrapods mass-produced

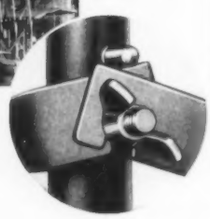
The largest size tetrapods—13 feet high—were produced for the Kahului harbor project on a mass production basis by Hawaiian Dredging Co., Ltd., Honolulu. The huge steel forms for the "pods" were designed by the company engineers. Each tetrapod required 15.8 cubic yards of concrete, and a total of more than 20,000 tons was used for the 600 pods that now protect the breakwater.

Six tetrapods were formed at a time. Concrete was supplied by a Rex

SAVE
ON SCAFFOLDING
with the EXCLUSIVE

BIL-JAX BRACE LOCK

With Bil-Jax it is never necessary to completely remove wing nuts to attach or remove braces . . . a great time-and-money saving feature!



Contractors like Bil-Jax steel scaffolding because one size cross brace fits *all* Bil-Jax end frames. There's no need to stock many sizes of braces. Your investment is kept to a minimum and your scaffold inventory made simple. And remember, there's a type of Bil-Jax scaffold to exactly fit *your* type of work.

Sales and Rental outlets in principal cities

EXPORT REP.:
MELVIN PINE & CO.
80 Broad St., New York 4, N. Y.

WEST COAST REP.:
A. PALMER SCAFFOLD CO.
3928 San Fernando Road
Glendale 4, California

Write for catalog!

GETS YOU UP IN THE WORLD
BIL-JAX INC.
Archbold, Ohio

For more facts, circle No. 380

LOAD DEMON SCOOPMOBILE gets a FULL load, because it's the only loader that can straighten up the bucket without lifting it off the ground! Moves materials faster, at less cost! Has 4-wheel steering, torque converter, planetary drive. (Pictured: Model LD-7) Investigate at once!

SCOOPMOBILE

Manufactured by
MIXERMOBILE MANUFACTURERS, INC.
8027 N.E. Killingsworth, Portland 20, Ore.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 381

Moto-Mixer that rode up a ramp to a 13-foot high platform and chuted concrete to the tops of the forms. After a 5-day curing period, the top of the form was removed by a crane. Only the end plates of the three bottom legs and the bottom form plate were left in place. Then the tetrapod was lifted from the bottom form plate and allowed to cure for an additional 23 days.

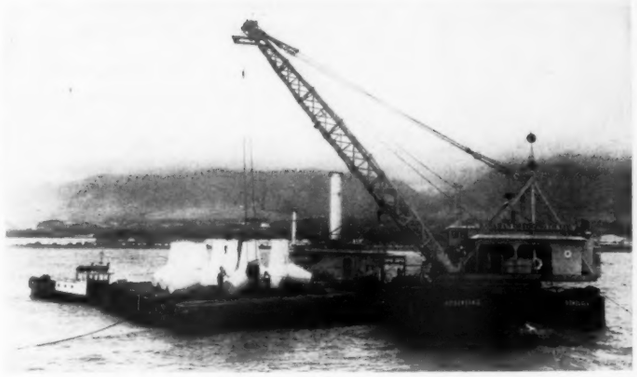
Since the compression-lift method was not feasible for handling the tetrapods, each "pod" was cast with a heavy ring bolt in the top of the body. A standard Tournacrane, modified by the addition of wheels, an A-frame, and counterweights, was used to transport the "pods" to scows. This modified Tournacrane, which had both increased reach and lift capacity, eliminated the need for the giant shapes to be handled by two cranes and low-bed trailers.

Eight of the 13-foot-high shapes were loaded to the deck of a scow to be carried to the H. P. Benson II, a crane-barge specially constructed for the job of placing the tetrapods. This crane-barge had a swivel hoist at its bow, instead of about 25 feet aft as is usual, giving the crane arm maximum lift and reach.

This rig dropped the tetrapods at random along the stable existing part of the breakwater and the anchor mounds of 12-ton basaltic lava rock that had been quarried on the island.

While it is still too early to assess the job, Hawaiian dredging officials point out that the project has already weathered two severe Pacific storms. These had no effect on the breakwater at all. Company officials feel confident that if the structures hold up on the Kahului breakwater, they will hold up anywhere in the world.

THE END



Far out in Kahului harbor, off mist-draped Maui Island, a deck barge delivers eight of the shapes to the Hawaiian Dredging Co. crane-barge.

Garrett Corp. appoints

Wilton E. Parker has been appointed assistant chief engineer for the AiResearch Industrial Division, Garrett Corp., Los Angeles, Calif. Parker, a former senior project engineer, is now responsible for all of the division's engineering activities in the manufacture of turbochargers and pressure ratio controls for diesel engines, industrial valves, fuel scheduling systems for industrial gas turbine engines, and other related items.

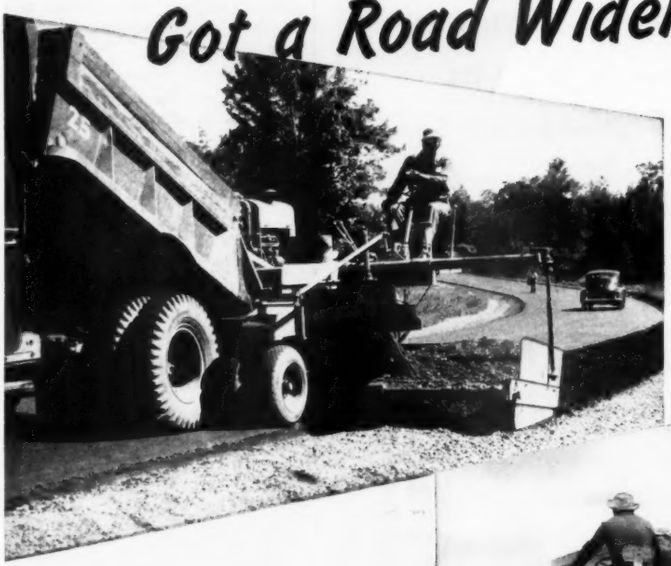
SKF Industries appoints two men to sales posts

James H. Sutherland has been appointed director of sales and Edward H. Wagner has been made Midwestern regional sales manager by SKF Industries, Inc., Philadelphia, Pa.

Sutherland, who will make his headquarters in Philadelphia, has served as the firm's senior division engineer, field engineer, district manager, and Midwestern regional sales manager.

Wagner, who will make his headquarters in Chicago, has been field engineer, manager of industrial sales, and manager of marketing during the time he has been with SKF.

Got a Road Widening Job?



Get more mileage per dollar with Blaw-Knox Road Wideners

Pave *concrete* without forms

Pave and finish *asphalt*

Spread any *aggregate* for base material

If you have a road widening job ahead of you, either as a contractor or a state engineer, you will be interested in equipment that will lower equipment investment, reduce labor requirement and give you the most work for the lowest cost. Blaw-Knox Road Wideners are ideal for any road widening or shoulder building program since they spread concrete, asphalt and any aggregate to an accurate line and grade. Hydraulic controls permit gradual widening of strip around curves when laying aggregate or asphalt. Vibrator attachments are available for any model to spread and finish concrete without forms. Large hopper, special conveyor belt and hydraulically controlled strike-off gate handle all types of material at a steady high capacity of up to 200 tons per hour. Tandem drive wheels on all models provide power to spare for pushing even the heaviest trucks up steep grades.

Blaw-Knox Dual Compression Trench Rollers are flexible and economical compactors for road widening jobs, too. They will roll widths from 20" to 39" and to depths of 24".

Your Blaw-Knox distributor can give you complete details on three models of Road Wideners and the Trench Roller.

BLAW-KNOX

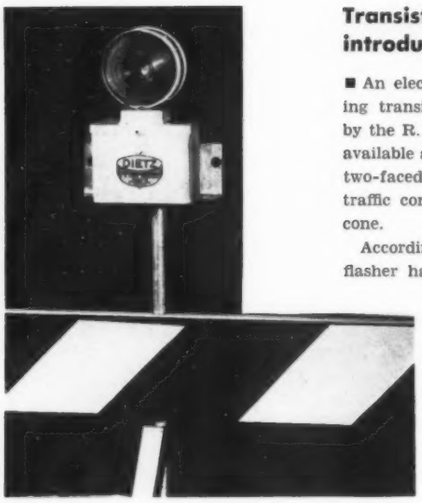
BLAW-KNOX COMPANY
CONSTRUCTION EQUIPMENT DIVISION
40 CHARLESTON AVE., MATTOON, ILLINOIS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 382

Transistorized flasher introduced in 4 models

■ An electronic highway flasher using transistors has been introduced by the R. E. Dietz Co. The flasher is available as a 360-degree barricade, a two-faced barricade, a 360-degree traffic cone, and a two-faced traffic cone.

According to the company, the new flasher has a long trouble-free life, can stand up under all weather conditions, flashes a bright signal, and is low in cost. The transistors require a fraction of the power and space of vacuum tubes. In tests, transistors have shown no failures after 18,000 working hours at full power, the equivalent of 8 hours per day for six years.



The Dietz two-faced barricade flasher is one of four models using transistors instead of vacuum tubes. The flasher operates dependably under temperature extremes or when submerged in water.

Tests have also indicated that the Dietz flasher will operate dependably in temperatures as high as 140 degrees F or as low as minus 40 degrees F. The flasher will also operate when submerged in water, the company reports. The flashing rate can be regulated between 60 and 70 times per minute.

The barricade models operate on 6 volts, using either one or two standard electric lantern batteries, and have a keyed lock and switch combination to prevent tampering. The traffic cone models use five standard D-cell batteries and an incandescent bulb. The two-faced models cover 90-degree fields, both front and rear.

For further information write to the R. E. Dietz Co., 225 Wilkinson St., Syracuse, N. Y., or use the Request Card at page 18. Circle No. 72.

Five-ton excavator-crane

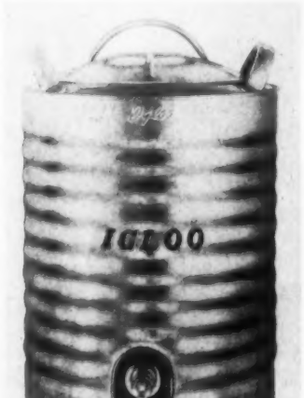
■ A bulletin describing the crawler-mounted Model C-35 Bantam is available from the Schield Bantam Co. The bulletin contains detailed information concerning the specifications, features, capacities, and application data of the ⅜-cubic-yard, 5-ton crane-excavator.

Features such as the two-speed independent travel, no-shift forward-reverse operation, and low ground bearing pressures are detailed and illustrated. Complete machine specifications are listed, and operating ranges and capacity ratings are given.

To obtain Bulletin No. C-101 write to the Schield Bantam Co., Waverly, Iowa, or use the Request Card at page 18. Circle No. 53.

Portable water cooler now has plastic lining

■ Portable water coolers made by the Bettis Corp. are now protected with Crystalining, a plastic lining that keeps drinking water and other liquids clear and odorless under the roughest conditions. Another new feature of the Igloo water cooler is the bottom construction which eliminates metal-to-metal contact, thus reducing heat transfer.



Igloo water coolers are available in 2, 5, 10, and 15-gallon sizes.

For further information write to the Bettis Corp., P. O. Box 9091, Houston, Texas, or use the Request Card that is bound in at page 18. Circle No. 107.

This hoist is the most efficient lightest, safest hoist in its capacity class available today!

The Coffing Super Power

Coffing Super Power hoists will give you more lift per pound of hoist and more lift per pound of handle pull than any other hoists in their class. Super Power hoists are available in six models from 1½ to 5 tons in capacity. Both the 1½ and 3 ton models are available in aluminum as well as the usual malleable iron. "Safety Valve" handles will bend before any load-bearing part can fail, and all hoists are tested at 100% overload.

Weight and bulk have been saved through the use of patented compound levers, rather than the conventional gears. These levers also give the hoists an increased efficiency of 85%. The operating handles may be adjusted for length and operated from either side of the hoists, and they cannot spin out of control.

For complete details write for Bulletin SP, Coffing Hoist Division, Duff-Norton Company, 810 Walter Street, Danville, Ill.

COFFING HOIST

For more facts, use Reader-Reply Card opposite page 18 and circle No. 383

STOP that WATER

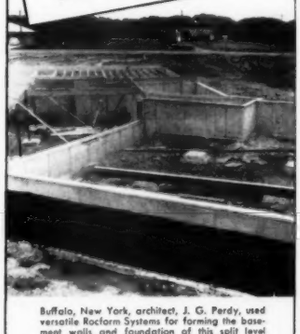
With FORMULA No. 640

A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—hold 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs. Applied quickly—no mixing—no cleanup—no furring—no membranes. Write for technical data—free sample.

HAYNES PRODUCTS CO., OMAHA 3, NEBR.

Case History #121

BUILD BETTER SPLIT-LEVELS FASTER with ROCFORM SYSTEMS



Buffalo, New York, architect, J. G. Perdy, used versatile Rocform Systems for forming the basement walls and foundation of this split level home. Picture shows a portion of the completed job with framing just beginning. Note absence of snap ties.

Contractor: United Wells, Inc., 182 Westfield, Buffalo, New York

WHY VERSATILE, COST-CUTTING ROCFORM SYSTEMS ARE BEST FOR EVERY CONCRETE FORMING JOB:

- They produce up to 3 times more jobs per unit because they're better built, better engineered, better designed.
- They eliminate snap ties.
- They automatically align walls with patented device that assures uniform wall thickness.
- All hardware, including waiers, tie rods, tie pins and clamps are fully guaranteed and are replaced without charge.
- They're the fastest and easiest of all concrete forming methods to set up.

WRITE, WIRE OR CALL NOW!

EASY PAYMENT PLAN

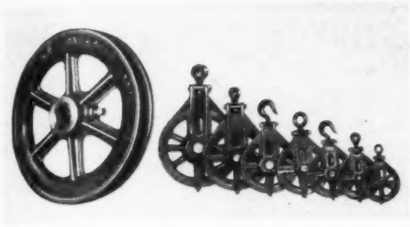
— FREE ENGINEERING COUNSEL

Get all the facts. We can positively show you how Rocform Systems can save you big money. Large contractor reference file available for your inspection.

Rocform CORPORATION
DEPARTMENT CE-3

WORLD'S LEADING PRODUCER OF CONCRETE FORMS
15160 W. 8 Mile Road
Detroit 35, Michigan

For more facts, circle No. 384



Durolite sheaves and blocks are lightweight and provide high structural strength for handling heavy loads at high speeds.

Lightweight sheaves have high structural strength

■ Sheaves which are said to be lighter in weight than other units of the same rated capacity and possessed of higher structural strength and durability for handling heavy loads at high speeds are available from Sauerman Bros., Inc. Durolite blocks using the new sheaves are recommended for easier handling and reduced wear on all running ropes.

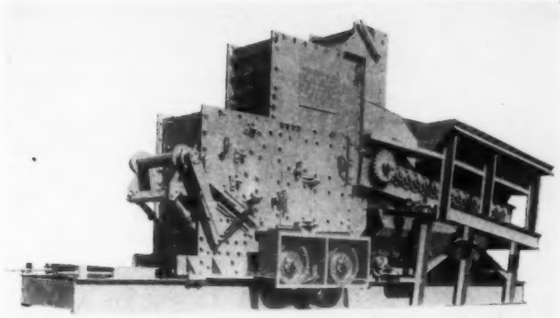
The sheaves are available in stock sizes of from 6 to 18 inches (alloy steel) and 20 to 24 inches (cast steel). They are said to start instantly and stop without spinning.

Durolite blocks feature end thrust bearings to prevent side frame wear, free-moving swivels for easy positioning, and a cast bead on the side frames to prevent fouling of the wire rope. They are available in stock sizes of from 6 to 18 inches with bronze bearings and from 8 to 42 inches with roller bearings.

For further information write to Sauerman Bros., Inc., 616 S. 28th Ave., Bellwood, Ill., or use the Request Card at page 18. Circle No. 105.

Allis-Chalmers promotes

L. C. Daniels has been made general manager of the Buda Division, Tractor Group, Allis-Chalmers Mfg. Co., Milwaukee, Wis., succeeding R. K. Mangan. Owen J. Higgins has been made general manager of the Harvey, Ill., Works.



A UNIVERSAL WOBBLER FEEDER has been combined with a Universal 3645 Impact Master crusher to form a portable single-crusher plant capable of closed circuit operation through a high ratio of reduction. The effect of the Wobbler feeder is to eliminate feed stoppage and reduce wear in the rotor hammers of the Impact Master by taking out all 2-inch-minus material ahead of the crusher. For more details write to the **Universal Engineering Corp.**, 625 "C" Ave. N. W., Cedar Rapids, Iowa, or use the Request Card at page 18. Circle No. 99.

LIFT OBJECTS QUICKLY—SAFELY... ANY SHAPE OR SIZE!

with DOWNS SAFETY GRABS for Cranes and Hoists

PILE BAND PULLER

Now you can tailor your lifting equipment to "fit" any shape or size materials to be moved with Downs Safety Grabs. No matter what your hoists are handling — pipe, rails, drums, plate or structural steel, stone, timber, boxes or odd-shaped objects of any size — there's a Downs Safety Grab designed for the job.

RIPPING HOOK

Downs Safety Grabs give you faster, easier lifting . . . and they're safety-engineered to provide a wider safety factor than listed capacity ratings. They can't let go until you release the load — real protection for workers that improves morale.

BEAM TONGS

Write for FREE illustrated catalog 2008-B for complete information on every model — today!

PILE POINT & BAND

PILE PULLER

DOWNS "THE GRIP that NEVER GIVES"

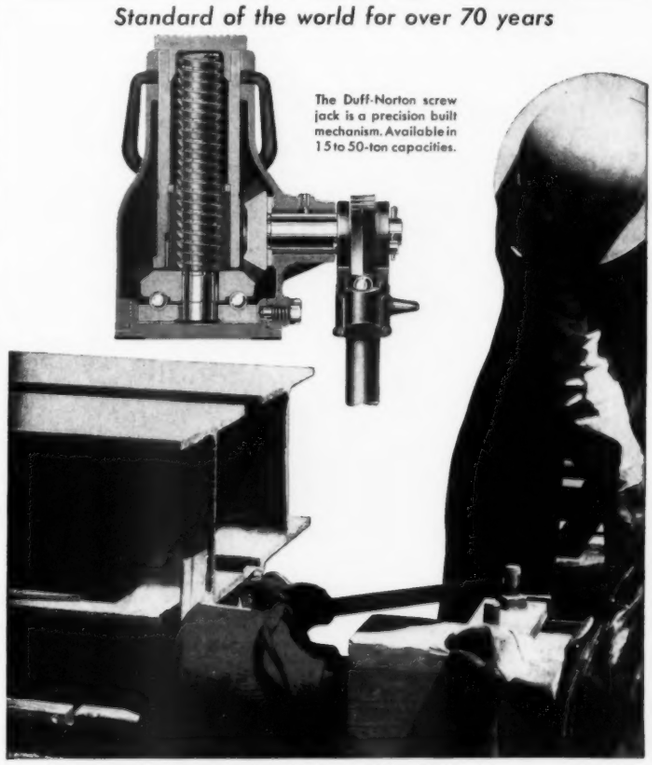
DOWNS CRANE & HOIST CO.
MECHANICAL ENGINEERS
540 W. VERNON AVE. • LOS ANGELES 37, CALIF.

For more facts, circle No. 385

Duff-Norton

Ball Bearing Screw Jacks can't creep or drop— will hold loads indefinitely

Standard of the world for over 70 years



The Duff-Norton screw jack is a precision built mechanism. Available in 15 to 50-ton capacities.

Can be used upright or on side with equal efficiency—no fluids to leak, no air to "lock."

Duff-Norton Ball Bearing Screw Jacks, employing the basic inverted nut and screw principle, are locked in position when under tension, can't move up or down unless you insert the jack handle and apply hand power to ball bearing actuated gears in base that turn the nut. They are safe, foolproof, dependable, fully enclosed, rugged—*seldom need lubrication or servicing.*

For complete specifications on various capacities and name of your nearest recognized distributor, write the world's oldest and largest manufacturer of lifting jacks, the Duff-Norton Co., P. O. Box 1889, Pittsburgh 30, Pa. Ask for bulletin AD-12-S

DUFF-NORTON

"Giving Industry A Lift Since 1883"

For more facts, use Reader-Reply Card opposite page 18 and circle No. 387

Need HOSE in a *HURRY?*

Suction • Water • Steam • Air • Multi-Purpose Discharge • Pile Driver

Wherever your job is—*whenever* you need hose—there's a Continental Warehouse nearby stocked to give you any kind of hose you want—*when* and *where* you want it.

There's no need to wait for distant shipments—no need to stop the job—no need to lose profits.

Any time you need hose call Continental. You'll like the fast service and dependable quality you get from these warehouses:

ATLANTA 5, Ga. 477 Eighth St., N.E.
BALTIMORE 18, Md. 15 East 21st St.
BOSTON (Allis. 34), Mass. 12 Franklin St.
CHICAGO 10, Ill. 10 West Hubbard St.
CINCINNATI 2, Ohio 49 Central Ave.
CLEVELAND 15, Ohio 2731 Prospect Ave.
DETROIT 27, Mich. 13801 Schoolcraft Ave.
INDIANAPOLIS 4, Ind. 309 North Capitol Ave.
MEMPHIS 3, Tenn. 268 Madison Ave.
NEW YORK 7, N. Y. 81 Murray St.
PHILADELPHIA 6, Pa. 311 North Randolph St.
ST. LOUIS 8, Mo. 4018 Olive St.
SYRACUSE 3, N. Y. 739 Montgomery St.

Continental Suction Hose is recognized nationally by contractors for its superior quality—not an ordinary hose, but a hose built for rugged, dependable service. Sizes 1½" through 12", for water and/or sand suction. Send for catalog of HOSE and PROTECTIVE CLOTHING.

HOSE by CR CONTINENTAL

CONTINENTAL RUBBER WORKS • 1989 LIBERTY ST. • ERIE 6 • PENNSYLVANIA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 386

A TECHNICIAN makes a test to determine the liquid limit of a soil sample in a mobile testing laboratory designed and constructed by Soiltest, Inc., for the Bureau of Public Roads, for use on the agency's overseas road-planning and construction projects. Fully equipped for standard soil and concrete tests, the lab is enclosed in a van mounted on a Four Wheel Drive Auto Co. truck. Its inside dimensions are 16×7 feet, room enough for four men to work comfortably. Designed for both on and off-the-road operation, the lab is self-sufficient, carrying its own water supply, electric generator, air compressor, air conditioner, and similar utility equipment. Testing equipment includes a portable 200,000-pound-capacity concrete testing machine for 6 and 12-inch cylinder tests, with attachments for cement tube and beam flexure tests. Soil testing apparatus ranges from permeameters to a field California Bearing Ratio set and unconfined compression testing machines. While the lab is in transit, all apparatus is stowed in special cushioned compartments in drawers and cabinets. For more information on the lab write to **Soiltest, Inc.**, 4711 W. North Ave., Chicago 39, Ill., or use the Request Card at page 18. Circle No. 89.

Corps seeks funds for civil works

A total of $647,115,000 is asked for the civil works program of the U. S. Army Corps of Engineers in the fiscal year of 1958, in the President's budget message to congress. This compares with actual appropriations of $637,532,500 for the fiscal year 1957.

In the "Construction General" program for the fiscal year 1958, funds are requested for the start of 24 projects, for the continuance of 163 and for 63 being planned.

pavers backhoes loaders

MILLER tandem *Tilt-Tops*
load 'em faster!
haul 'em safer!

the shortest time between jobs — a MILLER *Tilt-Top!*

Model "OT"-13 tandem $2,295.00*

It takes just ONE man to load this big Barber-Greene paver on the Miller OT-13 ton Tilt-Top . . . the shortest time between jobs for whatever equipment you haul. Faster loading, precise easy backing, on-a-dime maneuverability, cuts time between jobs . . . ups your *profit*—production time for men and equipment every day! Tilt-tops from 3 to 15 tons capacity—equipped with single or tandem axles . . . over-the-wheels or between-the-wheels platforms . . . put mobility under dozers, pavers, rollers, and trenchers of almost any size and shape.

Built for the "long haul", all Tilt-Top models have MILLER'S massive "EDG-SUPPORT" frames, Timken roller axle bearings and 2" oak deck platforms. Tandem models are equipped with a heavy box section walking beam that provides independent wheel action on each side for a more level ride and less jarring over rough terrain. It is one of the few trailer walking beams mounted on trouble-free Timken bearings.

Best of all . . . you pay no premium for quality—no comparable trailer undersells a MILLER! See these production boosters at your MILLER distributor today—and compare!

Model "BT"-10 tandem $1,630.00*

*F.O.B. Milwaukee
Complete with platform and tires. Any optional equipment extra.
Plus 10% Federal Tax

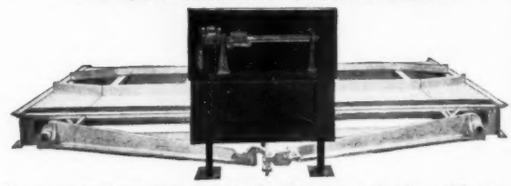
✓ **built best**
✓ **priced best**

Miller Tilt-Top Trailer Inc.

See your MILLER distributor or write for FREE literature to:
456 So. 92nd St., Milwaukee 14, Wis.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 388

WINSLOW—PORTABLE TRUCK SCALE
"THE CONTRACTORS' SPECIAL SCALE"



For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site. Cap.: 15-18-20-30, 50 tons.
Write us for name of your nearest distributor

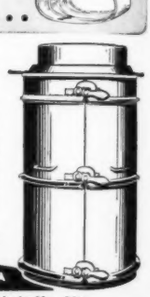
WINSLOW SCALE COMPANY P. O. Box 1198 Terre Haute, Indiana

For more facts, use Reader-Reply Card opposite page 18 and circle No. 389

No Matter What **SIZE...** No Matter What **SHAPE...**

QUINN CONCRETE PIPE FORMS
Set The STANDARD For Producing Quality Pipe!

Over 50 years of experience go into the production of every Quinn Concrete Pipe Form. That's why the Quinn Heavy Duty form is recognized as the STANDARD the world over for producing quality concrete pipe at the lowest cost. Used in making pipe by vibration, spading, or tamping. Sizes for pipe 10" to 120" and larger. Tongue and groove (as shown) or bell end pipe in any length desired. No matter what size, shape, or length pipe you need, there's a Quinn pipe form made to fit your requirements. Write today for our FREE catalog and estimates.



Also Manufacturers of QUINN CONCRETE PIPE MACHINES

Quinn WIRE & IRON WORKS BOONE, IOWA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 390

SWENSON SPREADERS
FOR ICE CONTROL

SPREADS SALT 200 LBS. PER MILE
OR IN ANY DESIRED AMOUNT
Lays a Narrow Strip or Full Traffic Lane

Handles all granular materials — salt, cinders, sand, calcium chloride, rock chips. Spreads at speeds up to 30 M.P.H. Clutch-controlled flow: steady or intermittent for hills and intersections.

Write for complete information

SWENSON SPREADER & MFG. CO.
LINDENWOOD, ILLINOIS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 391

EARTH BORING MACHINES...our business

We manufacture Sterling Hydraulic Control Earth Boring Machines in sizes and models to fit your job and budget.

Sterling Model "A" for heavy duty work
Sterling Enterpriser, 6 cylinder model
Sterling Enterpriser, 4 cylinder model
Sterling Prospector, built for REA and telephone work

FROM EVERY ANGLE...
STERLING DOES YOUR JOB BEST

Complete parts are available for Sterling, Jaques and other make earth boring machines. We completely rebuild and repair all makes diggers in our well equipped shops.

SALES SERVICE ANY WHERE IN THE NATION

WYOMING VALLEY EQUIPMENT DIV.
714 WYOMING AVENUE KINGSTON, PA.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 392

When You Judge and Choose a Construction Magazine—
Consider All These Points Together . . .

1. **CIRCULATION** . . . For maximum value, a magazine must offer maximum coverage of the important groups that influence the purchase and preference for their advertisers' products and services.
Contractors do the buying and C & E delivers more contractors!
2. **EDITORIAL** . . . New job methods and procedures, new products and services, better management planning and scheduling—add not only reader interest in the magazine but create a confident, loyal following that adds tremendous value for those who seek a market.
C & E delivers more editorial and a higher ratio of editorial to advertising!
3. **FORMAT** . . . Size, and arrangement of both editorial and advertising layout, together with overall organization of contents must all be evaluated and analyzed when a magazine's worth, *as an advertising medium*, is being judged.
Only C & E helps the advertiser with reading matter above and beside every 7x10 ad and standard spread.
4. **ADVERTISING** . . . The number of *advertisers*, of *exclusive advertisers* and *amount of advertising*—these are important considerations.
More advertisers, more exclusive advertisers, more advertising in C & E.

Contractors and Engineers
Magazine of Modern Construction
470 Fourth Ave., New York, N. Y.

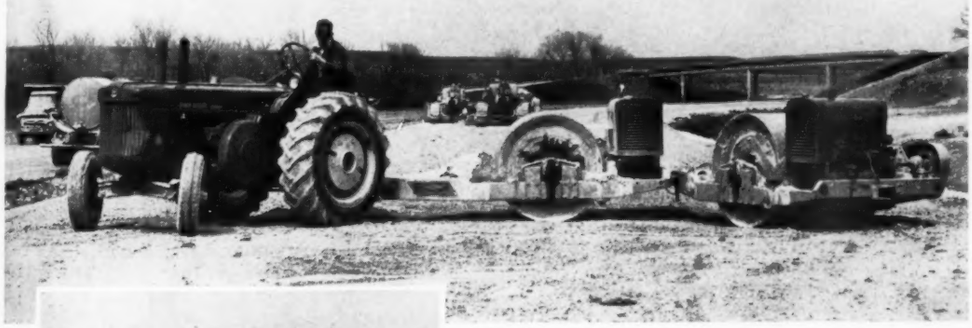
WORKMEN for the James Steele Construction Co. pour concrete for a warehouse wall in St. Paul, Minn. The forms are protected from the cold winter weather by Cell-U-Form, an insulation liner manufactured by the Wood Conversion Co. Cell-U-Form is made of pure wood-fiber cellulose which is obtained by cooking the chips of newly cut balsam, spruce, and aspen trees to remove sugars, lignines, and starches. The cellulose is then firmly bonded to asphalt-saturated and coated heavy kraft liners, with built-in flanges for easy stapling to wooden forms. The liner protects the concrete and assures proper curing in low temperatures. It eliminates the need for tarpaulins and salamanders, and a watchman to guard against the fire hazard of heated tarpaulins. For more details write to the **Wood Conversion Co.**, First National Bank Bldg., St. Paul 1, Minn., or use the Request Card at page 18. Circle No. 104.

Open web steel joists described in bulletin

■ A technical bulletin describing the effect of various types of bridging on the behavior of open web steel joists, shortspan series, is available from the Steel Joist Institute. The bulletin gives the results of an extensive test program sponsored by the Institute and conducted by The Department of Civil Engineering, Washington University, St. Louis, Mo.

To obtain Technical Bulletin No. IBR write to the Steel Joist Institute, Dupont Circle Bldg., 1346 Connecticut Ave. N. W., Washington 6, D. C., or use the Request Card at page 18. Circle No. 33.

McCARTHY IMPROVEMENT CO. of Davenport, Iowa, use 2 Terrapacs in tandem, behind a rubber-tired tractor, to compact their 17.3 mile contract in the heart of the Kansas Flint Hills.



BROCE CONSTRUCTION CO. of Dodge City, Kansas, also uses a light, wheel tractor to pull their Terrapac when compacting their 19 mile contract on the Turnpike in the vicinity of Emporia.

We're Proud of

TERRAPAC

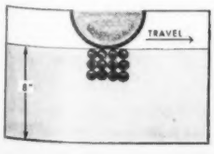
Performance on the Kansas Turnpike!

Compaction specifications were tough on the Kansas Turnpike but, when contractors used Terrapacs to compact the 8" crushed rock base course, the tough specs were met with speed and economy! . . . Terrapac's vibratory compaction permits laying of the entire base course before compaction begins. . . . In a few rapid passes, the 3½ ton Terrapac, pulled by a light tractor, can then compact the entire course to specifications. . . . This method has been approved and used on major turnpikes and tollroads in all parts of the country. . . . ***Ask your dealer for a demonstration.***

VIBRO PLUS

VIBRATORY ROLLERS

BEAT THE SPECS!

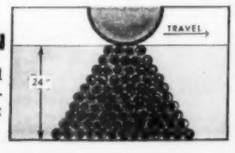


CONVENTIONAL STATIC COMPACTION

Rollers relying on weight alone produce friction forces between soil particles that prevent densification at any great depth.

TERRAPAC DYNAMIC COMPACTION

Vibratory forces, transmitted to soil in all directions, reduces friction—facilitates relocation of particles at greater depths.



VIBRO PLUS PRODUCTS, INCORPORATED • STANHOPE, NEW JERSEY

For more facts, use Reader-Reply Card opposite page 18 and circle No. 394

HOW TO HANDLE
WET JOBS

#35 of a Series

WELLPOINTS ELIMINATE SHEETING

Harbison-Walker Brick Refractory, Hammond, Ind. — *Contractor:* Consolidated Engineering & Construction Co.

WHEN A JOB-SITE is located, like this one, in the middle of a swamp —and when the water-bearing soil is a fine sand with an underlying layer of clay — it's not surprising that the contractor should figure on sheeting. Such expense, of course, runs heavy.

• Actually, in this case—as in many others which "look like" sheeting jobs—Griffin engineers were able to solve the problem far more quickly and economically with the use of wellpoints alone. Photo shows 2-stage system which successfully drained the 27 ft of ground water as required.

• Whatever your pre-drainage problems—power plants, pipelines, buildings, etc.—if you want lower costs for lowering water, it will pay you to check with Griffin, wellpoint specialists for over 2 decades.

GRIFFIN
WELLPOINT CORP.
881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.
In Canada: Construction Equipment Co., Ltd.
Toronto Montreal Halifax
For more facts, circle No. 395

For Sale:

D8 Caterpillar with Caterpillar PUC, both in fair condition. LeTourneau Angle Dozer and L. P. Scraper, both in excellent condition. Reasonable price for complete outfit. **KANDA BROTHERS, Lexington, Nebraska. Phone: Fairview 4-3460.**

Invest in
U. S. DEFENSE BONDS
Now Even Better

INDEX TO ADVERTISERS

Air Placement Equipment Co. 128
Allied Steel & Tractor Products, Inc. 150
Allis-Chalmers Mfg. Co. 43, 102, 127
American Bridge Div. . . . 48, 49
American Cyanamid Co. . . . 72
American Hoist & Derrick Co. 36, 37
American Road Equipment Co. 34
American Steel & Wire Div. 136, 137
Athey Products Corp. 151
Atlas Powder Co. 42
Austin-Western Works . . . 84
Badger Machine Co. 134
Baker-Roos, Inc. 150
Baldwin-Lima-Hamilton Corp. Lima Works-Const. Equip. Div. 125
Barber-Greene Co. 78
Benton Harbor Engrg. Works, Inc. 138
Bethlehem Steel Co. . . 74, 114
Bil-Jax, Inc. 154
Black & Decker Mfg. Co. . . . 47
Blaw-Knox Co., Const. Equip. Div. 155
BlueJet Chain Co. 110
Bros Boiler & Mfg. Co., Wm. 35
Bruning Co., Inc., Charles . 50
Brunner & Lay, Inc. 106
Bucyrus-Erie Co. 23
Buffalo-Springfield Roller Div. 145
Calweld, Inc. 133
Camp Co., Inc. 112
Carver Pump Co. 140
Caterpillar Tractor Co. 7, 14, 20, 21, 141, 163
Chain Belt Co. rt. hd. pg. of insert at pg. 50
Chevrolet Div., GMC 98
Chicago Pneumatic Tool Co. 30, 31
Clark Equipment Co. (Automotive Div.) 69
Clark Equipment Co. (Const. Machy. Div.) . . . 164
Cleveland Trencher Co. . . . 113
Coffing Hoist Div., Duff-Norton Mfg. Co. . . 156
Colorado Fuel & Iron Corp. . 124
Conrad, Inc. 138
Construction Machinery Co. 116
Continental Rubber Works 157
Contractors & Engineers 112, 158
Deere Industrial Div., John 70
Diamond Chain Co., Inc. . . . 51
Diamond Tool Associates . . 120
Dodge Corp., F. W. 19
Downs Crane & Hoist Co. . 157
Dudgeon, Inc., Richard . . . 61
Duff-Norton Mfg. Co. 157
Eagle Iron Works 119
Economy Forms Corp. 122
Eimco Corp. 10
Ellis Mfg. Co., Inc. 140
Erie Strayer Co. 146
Essick Mfg. Co. 46
Etnyre & Co., E. D. 80
Euclid Div., GMC . . 79, 86, 87
Frederick Iron & Steel, Inc. 110
Fruehauf Trailer Co. 90, 91
Fuller Mfg. Co. 81
Galion Iron Works & Mfg. Co. 131
Gar Wood Industries, Inc. 40, 41
GMC Truck & Coach Div. . . . 71
General Machine & Welding Works, Inc. 120
General Tire & Rubber Co. . 16
Geo-Optic Co., Inc. 151
Goodyear Tire & Rubber Co. 11
Gorman-Rupp Co. 59
Gradall Div., Warner & Swasey Co. 2
Greenville Steel Car Co. . . 161
Griffin Wellpoint Corp. . . . 159
Gulf Oil Corp. 22
Gurley, W. & L. E. 124
Hardin Associates, Inc., E. L. 75
Hendrix Mfg. Co., Inc. . . . 105
Highway Trailer Co. 144
Hobart Bros. Co. 62
Hoffman Bros. Drilling Co. . 128
Homelite Div., Textron, Inc. 132, 133
Hough Co., Frank G. 82, 83
Huber-Warco Co. 18
Hyatt Bearings Div., GMC . 89
Industrial Cab Co. 107
Ingersoll-Rand 38
Intercontinental Equipment Co., Inc. 140
International Harvester Co. 76, 77, 92, 93, 96, 97, 148, 149
International Vibration Co. 67
Iowa Mfg. Co. 32, 33
Jaeger Machine Co. 121
Kano Laboratories 58
Kensington Steel Co. 117
Koehring Co. 142, 143
Kotal Co. 153

Maginniss motor-in-head concrete vibrators—best for every job!

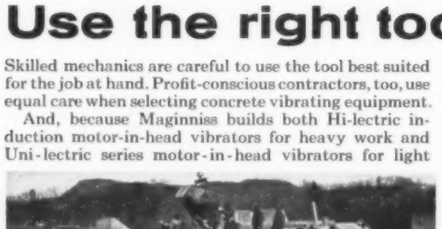
MAGINNISS HI-LECTRIC
for medium and low slump concrete —heavy work
MAGINNISS UNI-LECTRIC
for high slump concrete —light work

Use the right tool . . .

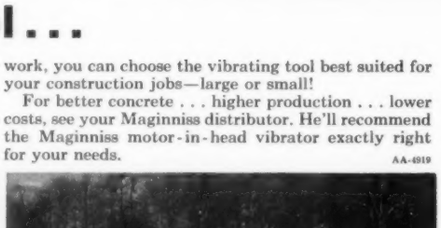
Skilled mechanics are careful to use the tool best suited for the job at hand. Profit-conscious contractors, too, use equal care when selecting concrete vibrating equipment.

And, because Maginniss builds both Hi-lectric induction motor-in-head vibrators for heavy work and Uni-lectric series motor-in-head vibrators for light work, you can choose the vibrating tool best suited for your construction jobs—large or small!

For better concrete . . . higher production . . . lower costs, see your Maginniss distributor. He'll recommend the Maginniss motor-in-head vibrator exactly right for your needs. AA-4919



HI-LECTRIC vibrators, featuring powerful induction motor-in-head design, are ideal for continuous use in heaviest service. Use them on bridges, culverts, heavy structures of all types and on paving jobs.



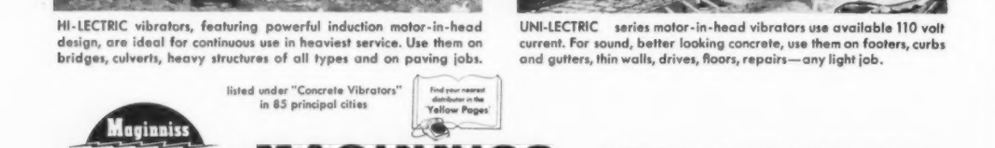
UNI-LECTRIC series motor-in-head vibrators use available 110 volt current. For sound, better looking concrete, use them on footers, curbs and gutters, thin walls, drives, floors, repairs—any light job.

listed under "Concrete Vibrators" in 85 principal cities

Find your nearest distributor in the 'Yellow Pages'

Maginniss HI-LECTRIC POWER TOOLS

MAGINNISS Power Tool Company
154 Distl Avenue, Mansfield, Ohio



For more facts, use Reader-Reply Card opposite page 18 and circle No. 396

Laclede Steel Co. 73
Leap Concrete, Inc. 116
LeTourneau-Westinghouse Co. 53, 99, 119, 123
Lima Works-Const. Equip. Div. Baldwin-Lima-Hamilton Corp. 125
Littleford Bros., Inc. 55
Lufkin Rule Co. 138
Lug-All Co. 100

Mack Trucks, Inc. spread on insert at pg. 50
Madesco Tackle Block Co. . 153
Maginniss Power Tool Co. . 160
Manitowoc Engineering Corp. 65
Marlow Pumps 39
Martin Machine Co. 147
Master Vibrator Co. 153
McConnaughay, K. E. lt. hd. pg. of insert at pg. 51
McGowan Pump Div., (Leyman Mfg. Co.) 146
McKiernan-Terry Corp. . . 150
McKinney Drilling Co. . . . 55
McKissick Products Corp. . 152
Mechanics Universal Joint Div. 88
Memphis Equipment Co. . . 135
Midland Industries, Inc. . . 144
Mid-Western Industries, Inc. 24, 25
Miller Electric Mfg. Co., Inc. 121
Miller Trailer Co. 158
Minneapolis-Moline 56
Mixermobile Mfrs., Inc. . . . 154
Mobile Office, Inc. 58
Monarch Road Machinery Co. 58
Muller Machinery Co., Inc. 100
Murray & Tregurtha, Inc. . . 100

Oliver Corp. 95
Olsen Testing Machine Co., Tinuis 100
Omaha Standard 130
Overman Mfg. Co., I. J. . . . 147

Phoenix Products Co. 118
Presstite-Keystone Engrg. Prod. Co. 62
Prewitt & Sons, J. R. 60
Prime-Mover Co. 107
Punch-Lok Co. 130

Quinn Wire & Iron Works . 158

Remington Arms Co., Inc. . 63
Richmond Screw Anchor Co., Inc. 60
Rocform Corp. 156
Rockford Clutch Div. 118
Rolcor Industries 145
Rolatape, Inc. 146
Rust-Oleum Corp. 85

Sasgen Derrick Co. 139
Sheppard Co., R. H. 118
Silent Hoist & Crane Co. . . 111
Simplicity System Co. 12
SKF Industries, Inc. 139
Snow-Nabstedt Gear Corp. 131
Sonoco Products Co. 106
Southwest Welding & Mfg. Co. 15
Standard Oil Co. (Indiana) Asphalt 57
Stow Mfg. Co. 129
Superior Concrete Accessories, Inc. 115
Superior-Lidgerwood-Mundy Corp. 123
Sure-Seal Equip. Co. 117
Swenson Spreader & Mfg. Co. 158
Symons Clamp & Mfg. Co. 109

Tarrant Mfg. Co. 111
Texas Co. (Asphalt) 5
Texas Co. (Lubricants) . . . 8, 9
Thew Shovel Co. 103
Thurman Machine Co. 130
Timken-Detroit Brake Div. . 66
Timken Roller Bearing Co. . 68
Twin Disc Clutch Co. 104

Union Metal Mfg. Co. 52
Union Wire Rope Corp. . . 44, 45
Unit Crane & Shovel Corp. . 135
United States Steel Subsidiaries 17, 48, 49, 136, 137
United Steel Fabricators, Inc. 125
Universal Atlas Cement Co. 17
Universal Form Clamp Co. 101

Van Brush Mfg. Co., Inc. . 134
Vermeer Mfg. Co. 129
Vibro-Plus Products 159
Victor Equipment Co. 64
Vulcan Iron Works, Inc. . . 122
Vulcan Tool Mfg. Co. 112

Wagner Electric Corp. . . . 54
Weldit, Inc. 58
White Instrument Co., David 133
White Mfg. Co. 121
Whiteman Mfg. Co. 13
Wickwire Spencer Steel Div., CF&I 124
Wiley Mfg. Co. 108
Willys Motors, Inc. 61
Winpower Mfg. Co. 152
Winslow Scale Co. 158
Wisconsin Motor Corp. . . . 63
Wix Corp. 162
Work Bulls Div., Massey-Harris-Ferguson, Inc. 28, 29
Wrought Washer Mfg. Co. 107
Wyoming Valley Equip. Div. 158

ROCK AND DIRT MOVE AS GREENVILLE ATECO RIPPER GOES TO WORK ON BLUE RIDGE PARKWAY

BIG BITE TAKES FULL POWER OF TD-24 TRACTOR

The big Greenville tractor-mounted ripper proved itself on a rough testing ground originally marked for blasting, and shovel and truck loading. Biting to depths of 24 inches, the powerful unit tore out layers of rock and dirt without explosives. Swivel shanks give the points live action that shatters rock and dirt loose for scraper loading.

Roy Cantrew, veteran construction man who operated the unit, used it to rip, bulldoze and push-load. He found it possible to raise or lower the ripper points as little as an inch at a time . . . a control factor that marks the precision construction put into the new tool.

PUSH-LOADING SCRAPER

The new Greenville ripper does not interfere with push-loading operations or steering of the tractor. On this job all loading was planned to be a truck-shovel operation. The powerful bite of the ripper made

push-loading possible—a big saving in man-hours and equipment operation.

AND BULLDOZE, TOO

Addition of the ripper does not hamper bulldozing operations. Blade and ripper are in place at all times. Many operators rip one way, turn around, then bulldoze their way back. One man with one machine can handle jobs previously done by three or more pieces of equipment.

FOR MORE INFORMATION

You'll want to know more. Your nearby International dealer can give you the facts. He's listed in the Yellow Pages of your phone book. If you can't find him, write to us.

GREENVILLE RIPPERS MOUNT ON TD-24 . . . TD-18 . . . TD-14

ATECO

GREENVILLE
STEEL CAR COMPANY
ATECO DIVISION
Greenville, Pennsylvania

For more facts, use Reader-Reply Card opposite page 18 and circle No. 397

Surveying Washington

by HUBERT KELLEY, Jr.

One of the first hearings held when the 85th Congress opened for business had to do with the status and progress of the 13 to 15-year federal-aid roadbuilding program. Summoned by Sen. Albert Gore (D., Tenn.), chairman of the Senate roads subcommittee, Secretary of Commerce Sinclair Weeks and Federal Highway Administrator John A. Volpe gave reassuring answers to questions of whether any unexpected difficulties had cropped up to threaten the highway construction timetable.

No "significant delays" have developed so far, according to Secretary Weeks, who added that the program is moving along "very rapidly." In the interval since passage of the road bill last summer, he said, more project funds have been allotted for roads than in any previous full year in history.

Since last June, according to the Secretary, state highway departments have submitted general advance programs for interstate system improvement totaling more than $4 billion. This includes an estimated $901 million in authorizations to states to advertise for construction bids on 743 miles of superhighways. The latter figure also takes in the cost of engineering and right-of-way acquisitions.

Some $286 million in contracts have actually been awarded for 496 miles of construction, Secretary Weeks disclosed. In Kansas, two projects have already been finished and are in service.

The Secretary emphasized that these figures apply only to the interstate system. If funds for primary, secondary, and urban roads are added to these amounts, the total of highway improvements started since last summer stands at $1.3 billion.

Optimism about the future of the highway program showed in the Secretary's remark: "There is every reason to believe that the present rate of progress will be maintained and further increased in future months." A big factor favoring a speed-up was the decentralization move which transferred virtually complete operating authority from Washington to field offices of the Bureau of Public Roads. With the red tape snipped, the BPR offices in each state have the power to take final action on the detailed location of federal-aid highways, on programs proposed by the states, and on federal-state project agreements.

The Secretary indicated he might back proposals to amend the Highway Act of 1956 to restrict advertising adjacent to the interstate system in the interest of safety and of preserving the scenic landscape. But he appeared cool to Sen. Gore's pet proposal to sever the road program from the Department of Commerce and have it administered by a new and independent federal agency. More will be heard on this issue later.

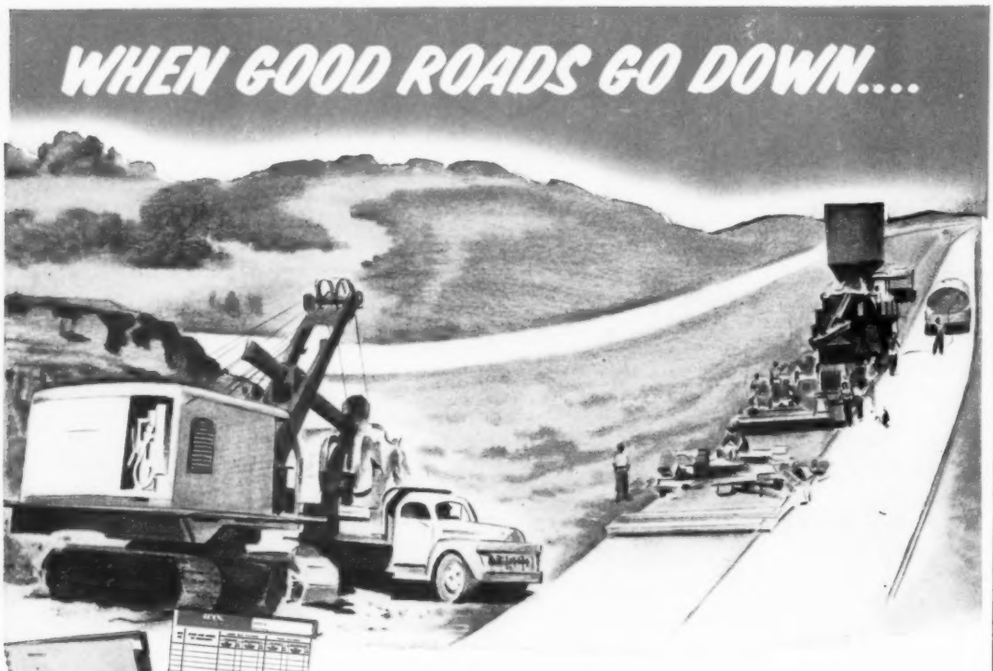
Twice the number of engineers and technicians now employed by state highway departments are actually needed if states are to carry out the building program, according to Federal Highway Administrator John A. Volpe, who followed the Secretary to the stand. But such additional manpower is not available now, nor will it be in the "reasonably near future" he contended. Thus, the only answer is to boost highway engineering efficiency.

Turning to the availability of contractors, and the capacities of individual firms, Volpe revealed that during the first nine months of 1956 a total of 12,610 bids were received on 2,255 federal-aid projects—an average of 5.6 bids per project. On the average, the low bids in this period were 3.9 per cent under engineers' estimates.

The capacity of the contracting industry to perform work is rising, Volpe stated, since contractors are tending to replace present equipment with newer and larger units that can do more work in less time. He attributed the trend to the assurance of a long-range and substantial building program provided by the Highway Act.

Highway equipment manufacturers, said Volpe, realizing that their products will be in great demand, are expanding their output facilities. A total of $275 million has already gone into such programs. Plant expansion in the earthmoving equipment field is especially impressive, he added, and the "tight supply situation" should be eliminated in the "very near future."

On materials availability, Volpe told the subcommittee that the cement supply is "tight but not critical". He said he expected that the added productive capacity now be-



MAINTENANCE COSTS GO DOWN TOO WITH WIX HEVI-DUTY OIL FILTERS!

FREE: Complete Oil Filter Survey showing correct WIX Replacement Cartridges for all your equipment, plus automatic inventory control.

It makes no difference what type of equipment you've got on the job—Diesel or gas, mobile or stationary—WIX has the right Oil Filter Cartridge for YOU! For full-flow or partial-flow filtration systems, for lube or fuel, there's a specially designed WIX Cartridge engineered for—

CATERPILLAR • LE TOURNEAU • INTERNATIONAL
ALLIS-CHALMERS • EUCLID • MURPHY • LE ROI
AND ALL OTHER CONSTRUCTION EQUIPMENT

WIX will survey your filter needs FREE and set up an Inventory Control System, tailored to your operation. Also provide a back up supply of every Cartridge you use, carried by your local WIX Wholesaler, to give you immediate service and hold your job-site inventory down. Ask for your FREE Survey and the details on time and money-saving WIX Engineered Filtration Service. Call your Jobber or write direct today!

MODERNIZE YOUR FORD VEHICLES!

This great, new WIX "SPIN-ON" Oil Filter is original equipment on Ford family cars for '57!

AND! — There's a WIX CONVERSION for pre-'57 Ford Cars and Trucks now equipped with old-style full-flow filters. A simple Adapter converts these Vehicles to use this sensational WIX "SPIN-ON" OIL FILTER!

wix®
OIL FILTERS CARTRIDGES
AUTOMOTIVE • INDUSTRIAL • RAILROAD
WIX CORPORATION • GASTONIA • N. C.
In Canada: Wix Accessories Corp. Ltd., Toronto

For more facts, use Reader-Reply Card opposite page 18 and circle No. 398

coming available would take care of the anticipated needs of both the highway and general construction programs.

The outlook is not as bright for the steel situation. Volpe declared that both structural steel shapes and steel plates are now "very difficult to obtain", and that 20-month deliveries are being quoted on heavy structural fabrication in some areas.

Despite this, Volpe said, "relief from this critical situation is indicated by the present development of additional steel-producing capacity and by plans to substitute other materials that are in more ample supply."

A four-corned fight over federal aid for school construction shaped up quickly in the new Congress, with half a dozen bills being introduced in the House on opening day.

The two principal camps are represented by the Kelley bill, which has strong Democratic support, and the Frelinghuysen bill, which incorporates the Administration's proposals. The measures differ both in amounts to be granted to the states and in the formula for distributing the money.

The Kelley bill calls for payments of $600 million a year for five years, with the Federal money distributed in proportion to the school-age population of each state. The Republican bill, requiring only $300 million a year over the next four years, grants the money to states according to need. Under the latter bill, for instance, Mississippi might receive more money than New York, while the reverse would hold true under the Kelley bill.

While seemingly far apart, both sides admit privately that compromise is possible, if not necessary. One compromise receiving serious attention in both the House and Senate was designed by the National Education Association. The plan calls for part of the money to be distributed to states on the school-age formula, but would set aside another amount for the ten or twelve states that most need the money.

The third camp is led by Rep. Adam Clayton Powell, the New York Democrat who switched to the Eisenhower bandwagon in November. Rep. Powell's integration amendment contributed to the defeat of the school bill last year, but he says he will push for it again in sessions of the 85th Congress.

The fourth camp is made up of those congressmen who will vote against almost any school bill because they are flatly opposed to federal intervention in education. At this time, it is impossible to determine the numerical strength of this opposition, but there are signs that the camp is smaller than it was last year.

Cash awards by the National Inventors Council to private citizens for ideas and inventions contributing to the national defense would be possible under a new bill introduced in the house.

The council, created by the Secretary of Commerce in 1940 to act as a link between the inventive public and the armed forces, has never been able to reward inventors. It has referred inventions with military value to the proper defense agency and done its best to "sell" the idea on behalf of the inventor.

Though little has been heard of the council in late years, it has recently been spurred by the armaments program to seek more ideas from the general public. At present, some 300 technical problems affecting the national defense are available from the council's offices at the Department of Commerce in Washington. A number of these problems may well be solved by independent engineers and builders. All ideas are studied carefully by a committee of civilian inventors headed by Dr. Charles Kettering of General Motors. THE END

4 FEET OF FROST

—BUT THE D9 IS BOSS

Boss of all bulldozers is the giant Caterpillar D9 Tractor. When this picture was taken last winter, John Arborio, Inc., was moving 1½ million yards of frozen earth, 75% of it rock, to build a section of Route 17 in Sullivan County, N. Y. With four feet of frost in the ground, conditions were about as tough as possible.

That didn't stop the D9. With its CAT*-built No. 9S blade, this machine weighs over 34 tons, and its broad tracks with hardened steel grousers give it tremendous 'dozing traction. It has the *power* to dig into hard ground, too—320 HP at the flywheel, and 98,000 pounds maximum drawbar pull!

In repeated tests where accurate records have been kept, one D9 has outworked *two* bulldozers of the next size. Blade loads average 12 cubic yards of earth and are handled at higher speeds. On 'dozing hauls up to 100 feet, cycle times average less than 1½ minutes, and production runs up to 600 cubic yards per hour.

The D9 is big, heavy and ruggedly built to lick the toughest jobs. Yet, with its power-boosted controls and excellent visibility, it's one of the easiest of all tractors to operate. Maintenance is easy, too. The D9 is available with either torque converter or direct drive with oil clutch.

Your Caterpillar Dealer can show you performance records that prove the real economy of the D9 as a bulldozer, pusher or hauler. And he stands behind the long life of every machine with reliable, round-the-clock service and parts you can trust. See him today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

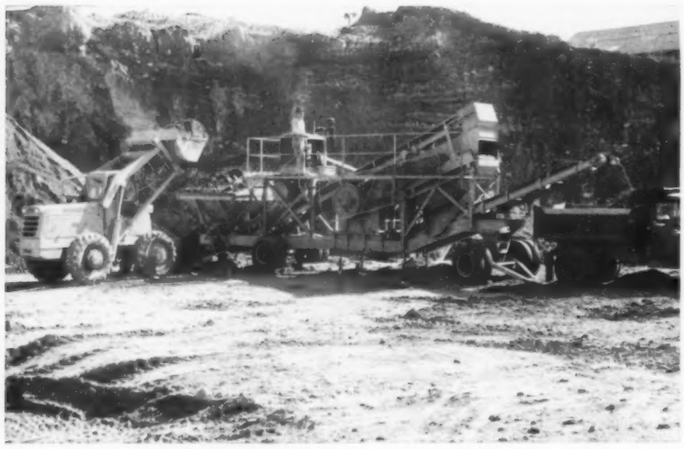
HEAVY-DUTY EARTHMOVER FOR THE HARD WORK

For more facts, use Reader-Reply Card opposite page 18 and circle No. 399

(Advertisement)

SOME UNUSUAL WAYS

Michigan Tractor Shovels are saving time and money for paving contractors around the country



Feeds portable crusher—Making good use of its high lift, Michigan Model 125A digs and dumps raw bank gravel into hopper of 100-ton-per-hour base material plant. Location: Southern Hills Inc pit, Dayton, Ohio.

Breaks, loads asphalt—Before resurfacing street in Worcester, Mass., Contractor Charles Chaffee uses 1¼ yd Michigan to strip old asphalt. No "ramming" is required—powerful breakout quickly shatters paving.

Pours concrete—Hauling concrete in Michigan Tractor Shovel bucket, Slattery Rock Corp. solves problem of laying 6 lanes of New York's Deegan Expressway under low viaduct. Two of these maneuverable "buggies" needed only 4 hours, 200 to 250 trips to pour 800 ft of each of 12 ft lane.

Grades shoulders—Special side bucket attached to Michigan 175A does jobs not possible with grader drop-blade . . . including filling holes, distributing gravel, removing spoil next to newly-poured slab. Attachment, designed by Villa Contracting Co, is helping widen 27 mi of N.J. Garden State Parkway.

Cleans pavement—Highway must stay open, said Nashville officials, so Wright & Lopez do cleanup with small, agile 16 cu ft Michigan. Only 4'2" wide, 10'8" long, unit works rapidly, doesn't block traffic, doesn't damage newly-set pavement.

Carries pipe—One of Peter Kiewit's Michigans serves as all-around handyman on company's Indiana Turnpike contract. This 95 hp model lifts up to 11,000 lbs, carries 5,500 lbs at 4 mph. Note excellent all-around visibility given operator.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 400